Residual Income Models and the Valuation of Conventional and Islamic Banks

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Abstract

As a result of the global growth of the Islamic banking industry it becomes increasingly important to be able to determine the value of Islamic banks and compare their ability to create value with other banks in the industry. This research starts with the identification of the most suitable model to determine value of banks in general. Different models are evaluated, and the most suitable model to explain the cross-sectional returns of banks is determined to be the Residual Income model. Estimation of the parameters of the model for conventional banks is fairly similar to that of other types of industries, with the exception of capital, which is defined as equity capital only since other capital can be regarded as operational funds. The Residual Income model is applied to conventional banks, to determine that the model, to a significant degree, captures the cross-sectional differences in stock market returns of conventional banks over a significant period of time.

For Islamic banks, the estimation of parameters differs, amongst others due to the different balance sheet structure, and the lack of availability of market data. The application of the Residual Income model to Islamic banks results in the identification of a number of issues. Although indicative, this research finds that it is possible to determine the value of Islamic banks using the same model as can be applied to conventional banks. Once the issues surrounding the application of a Residual Income model to Islamic banks are resolved, further research will have to be undertaken to validate the initial results of this research.

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Introduction

> "The growth rate of Islamic banking services has outpaced that of "conventional" banking during the past decade, making it one of the most dynamic areas in international finance. The annual growth of Islamic Financial Institutions (IFI) has been an estimated 10% in the Gulf and almost 15% worldwide over the past 10 years. IFI's assets and funds under management are estimated at about $200-$300 billion. Islamic banking activities are expected to grow even more rapidly in the foreseeable future." (Standard & Poor's (2002))

As a result of the global growth of the Islamic banking industry it becomes increasingly important to be able to determine the value of Islamic banks and compare their value creation potential with other banks in the industry. Although the balance sheet structure of an Islamic bank differs from a conventional bank, conventional and Islamic banks operate in the same industry and are not substantially different in their operations. The differences between conventional banks and Islamic banks, however, need to be considered carefully when applying an identical valuation framework to both types of banks.

The purpose and contribution of this research is firstly to identify the most suitable model to determine the value of conventional banks. In this respect, this research establishes that the Residual Income model can, to a significant degree, capture cross-sectional differences in stock market returns of conventional banks over a significant period of time. As a result, the Residual Income model is deemed suitable to determine the value of a conventional bank. Secondly, the Residual Income model is applied to Islamic banks, with an initial view to determine how to apply the same model to determine the value of Islamic banks. Although the results of this research are indicative, the issues surrounding the application of a Residual Income model to

Islamic banks hinder the ability to draw a definitive conclusion whether or not the Residual Income model can be applied to Islamic banks in order to determine their value. Once these issues are resolved, further research on whether or not the Residual Income model is suitable to be applied to determine the value of Islamic banks will need to be undertaken to validate the initial results of this research as well as the assumptions. Although academic in nature, the results of this study will furthermore improve practical analysis of the value of conventional banks, and provide an increased understanding of Islamic bank specific issues in this area.

This study does not define a completely new framework. Rather, existing valuation models are reviewed, and the most suitable model is selected and applied to a sample of conventional banks. The same model is then applied to Islamic banks, taking into account specific issues in relation to the determination of capital, cost of capital and returns, and identifying the issues related to, among others, lack of market data, limited sample size, and the lack of implementation of uniform accounting standards.

This study is not concerned with measurement of periodic performance as such, whether in a narrow financial performance sense, or in a wider sense incorporating non-financial variables (c.f. Kaplan and Norton (1992)). Rather, periodic Residual Income is used as a key component of a valuation model.

Chapter 1 provides general background information of the valuation of firms and the parameters involved. From empirical research in the area of valuation in general, two main streams of models surface, the Residual Income or Economic Profit type

models, and the Discounted Cash Flow models. Each of these models has its specific advantages and disadvantages, which are discussed in further detail in chapter 2.

The determination of the cost of capital is one of the most critical parts of any valuation model, and also reflects the perceived risk of an institution. The cost of capital can be determined using the Capital Asset Pricing Model (CAPM) or the Arbitrage Pricing Theory (APT), which are further described in chapter 3.

Chapter 4 provides an overview of the known issues in Islamic banking, which need to be taken into consideration as part of this research. Chapter 5 contains the research method, followed by the results of the research for conventional banks in chapter 6. The issues concerning the application of the Residual Income model to Islamic banks are described in chapter 7, followed by the results of the application of the model to Islamic banks in chapter 8. Chapter 9 contains concluding remarks and areas for further research.

1. Valuation of Firms

The requirement to measure current and future (expected) profitability and thus the ability to determine the value of a firm is not just a concept of recent years, but rather one that has evolved over the past two centuries. As early as 1776, Adam Smith (1881 – Book I) states that:

> "The owner [of the capital], though discharged of all the labour, expects that his profits should bear a regular proportion to his capital. [...] The lowest rate of profit must be more than sufficient to compensate the losses to which the employment of stock is exposed. The lowest rate of interest must more than compensate the occasional losses to which lending is exposed."

Smith clearly identified not only the need to measure profitability, but also recognised that risk and return are linked to one another in such a way that higher risks need to be offset by higher returns. Ever since then, the desire to be able to measure current and estimated future profitability of a firm, both in isolation and in comparison to others operating in the same market segment, has intensified. In 1890, Alfred Marshall (1895:157) states in volume 1 of the Principles of Economics:

> "What remains of his capital at the current rate may be called his Earnings of Undertaking or Management."

A review of the context of this statement leads to the conclusion that the 'Earnings of Undertaking' is in fact identical to Economic Profit, which is calculated by subtracting a capital charge from net income after taxes.

Economic Profit measures in general, and more specifically the Residual Income measures implied in Marshall's statement, are based on current

returns, and do not necessarily include future expected growth or the risk related to the (long-term) investment. Expected future growth and risk are however important issues for consideration. An investment may appear highly profitable, but the return will have to be related to the risk taken by the investor. Risk and future growth are intertwined with the following three main components of company valuation:

- Returns (both current and future);
- Capital;
- Cost of Capital.

1.1. Measuring Growth

Growth most importantly concerns the growth that can be sustained by a firm over longer periods of time. In its most simplistic form, sustainable growth can be determined as follows (e.g. Lee, Myers and Swaminathan (1999)):

$$g^* = (R)(ROE) \tag{1}$$

Where g^* is the sustainable growth rate, R the earnings retention rate, or the proportion of income the firm retains for reinvestment, and ROE the Return on Equity. Equation (1) relies on the assumptions that a firm wants to grow as fast as possible, there is no requirement to issue new equity, and the firm wants to maintain its current capital structure and dividend policies (Higgins (1998)).

The main issue related to the determination of growth is that the growth rate is generally based on historic data. However, history does not necessarily repeat itself.

1.2. Measuring Risk

In general, it can be stated that the return on an investment should reflect the level of risk incurred. In other words, an investor will only be willing to invest in a higher risk asset if the level of return reflects the level of risk involved. The risk-return trade off in combination with the investor's risk profile will determine whether or not he will accept the investment. The risk-return trade-off needs to be monitored and managed in order to ensure continuity of a firm's operations.

Bank specific risks are described in table 1 below.

Type of Risk	**Description**
Liquidity Risk	The risk of insufficient liquidity for normal operating requirements, that is the ability of the bank to meet its liabilities when they fall due (Heffernan (1996:165/6))
Interest Rate Risk	The risk arising from interest rate mismatches in volume, maturity and type (fixed vs. floating) of interest-sensitive assets, liabilities and off-balance sheet items (Heffernan (1996:167))
Credit Risk	The risk that an asset or a loan becomes irrecoverable in the case of outright default, or the risk of delay in the servicing of the loan (Heffernan (1996:165))
Settlement or counterparty Risk	The risk that occurs if one party to a transaction pays funds or delivers assets prior to receiving its own funds or assets, hence exposing it to a potential loss (Heffernan (1996:166))
Price Risk	The risk that the market price of an instrument traded in a well-defined market will be volatile. Market risk occurs in relation to debt securities, derivatives, equity derivatives and currency transactions held by a bank (Heffernan (1996:167/8))
Leverage Risk (Capital Adequacy)	The risk related to the extent to which the assets of a bank may decline before the positions of its depositors and other creditors are jeopardised (Heffernan (1996:168))
Event or Operational Risk	The risk of certain events occurring, e.g. disaster, regulatory or political events, or the (temporary) unavailability of IT systems (Jorion (2001))
Business Risk	The risks related to products, macro-economic cycles and technology changes (Jorion (2001))

Table 1: Types of Risks for Banks

The need to quantify these risks has resulted in the development of what is currently the most widely used risk measure for banks, Value at Risk (VaR). VaR attempts to measure the downside risk of either a portfolio or, in aggregation, a firm into one single number, taking into account financial leverage and diversification effects. The result of the VaR equation is

represented in the maximum amount a bank is likely to stand to lose on a given day or over a number of days (e.g. over a period of one week), generally with a confidence interval of 95% or 99%. It incorporates traditional risks and risks related to adverse market movements of financial derivatives and structured products. In addition, VaR may also be used as a basis to calculate the amount of economic capital required to support a business, which is an essential component of economic value added measures. VaR mainly provides an indication of the maximum risk a bank is exposed to under predictive conditions (e.g. the assumption that the distribution of the underlying price data is approximately normal), and may not necessarily be suitable as an internal measure to control risk or to determine profitability. VaR is for instance used in the calculation of regulatory capital required to support market risk under the Basel Capital Accords. Besides VaR, Risk Adjusted Return on Capital (RAROC) is often used as a risk measure by banks. The purpose of RAROC is to adjust trading profits by the remuneration of risk capital, and it recognises that trading positions with a higher risk profile require a larger amount of economic capital to absorb larger potential losses.

Any risk taken by a bank will have to be evaluated against its risk management system, as well as the cost of the measures in place. The complexity of banks seriously hinders simple assessment of the risks taken and how they are controlled. However, as Bookstaber (1999) argues, it will not be possible to incorporate safeguards against all risks within the risk management system of a bank. A more complex risk management system may

actually make the situation worse, due to the increasing complexity that is introduced.

1.3. Measuring Returns

> "Economists and accountants differ on the proper definition of profit. To the accountant, profit is the excess of revenues over expenses and taxes and is best measured by earnings. To the economist, earnings fails to include an important expense item, the opportunity cost of equity capital, contributed by the shareholders." (Kimball (1998))

This statement stipulates the main difficulty surrounding the measurement of returns: what constitutes returns depends very much on whom one is discussing the subject matter with.

Returns are a major part of valuation, and therefore need to be defined carefully. Further complications arise due to the fact that in order to determine the value of a firm, current returns in themselves are not sufficient. The value of a company as a whole is based on a combination of current and future (expected) earnings. Different schools of thought exist when it comes to the identification of returns, the main ones being:

- Earnings;
- Free Cash Flow;
- Dividends.

Based on the generally accepted notion that a company's value should be established with reference to the net present value of the potential cash distributions it is expected to generate, the use of earnings seems to be the

most logical. However, as Sloan (1996) argues, earnings have serious limitations due to the usage of the realisation and matching principles in accounting. The usage of these two principles basically results in recognition of earnings in different periods than the underlying cash receipts and disbursements. On the other hand, the usage of free cash flow has its limitations as well, and neither measure incorporates how changes in future business conditions are expected to affect future earnings or free cash flow. As a result of the shortcomings of both earnings and free cash flows, Sloan argues that a combination of current earnings and expected future free cash flows provides the best basis for valuation.

Black (1980) finds that the earnings figure seems to be a better measure of value than the book value figure. He states that:

> "Even though accountants have not formally recognised the goal of having an earnings figure that measures value, they have done a remarkably good job of achieving this goal. That's the magic in earnings."

Based on his findings that the Price/Earnings multiple is more stable than the Price-to-Book Value ratios, Black reaches the conclusion that earnings as they are reported in the financial statements can be used directly when determining the value of a company.

Ohlson (1990) argues that, under uncertainty, expected future dividends serve as the only relevant valuation attribute since ultimately only payoffs count and dividends alone can be consumed. This statement is in line with the findings of Easton (1985), who found a positive association between current earnings and future dividends and, controlling for current earnings, a negative association

between current dividends and the present value of future dividends. Easton states that his findings are consistent with the notion that accounting earnings reflect the dividend paying ability of the firm and that these earnings may be either paid in the current period or reinvested. Ohlson (1995) further argues that cash flows or earnings may have an important function in predicting the present value of future dividends, but that this does not necessarily imply that either cash flows or earnings are a relevant attribute of the valuation of the firm. At the time the stock of a listed company goes 'ex dividend', the decline in stock price approximates the dividend, hence potential future earnings or cash flows appear not to be considered in the valuation.

However, even though dividends are assumed to be superior, Ohlson identifies that future dividends are not the sole measure based on which added value can be determined, and investigates the expected development of abnormal earnings, adjusted for risk, as the measure to value a company. Abnormal earnings are then restated as certainty-equivalents using a risk adjustment, and discounted at the risk-free cost of capital, which is represented by the yield curve of the risk-free rate. Ohlson concludes that, in deriving the value of a company, using the Present Value of Expected Dividends (PVED), abnormal earnings can be a substitute for dividends, which allows for the incorporation of retained earnings and their implications on future earnings. Ohlson arrives at this conclusion on the basis that dividends not only reduce market value on a dollar-for-dollar basis but also have a negative impact on earnings in subsequent periods, mainly because the firm cannot reinvest dividends paid.

Penman and Sougiannis (1998) argue, in line with the findings of Ohlson (1995), Feltham and Ohlson (1995) and Lee, Myers and Swaminathan (1999), that as long as a firm's earnings and book value are forecast in a manner consistent with 'clean surplus' accounting, the value of a firm can be defined as the current book value plus an infinite sum of discounted residual income. Residual income is in this case defined as earnings that exceed the required rate of return on capital over the remaining life of the firm. Peasnell (1982) arrives at a similar conclusion, and states that any all-inclusive measure of profit (suitably adjusted) can be discounted back to economic value. In this respect Peasnell identifies accounting profit as being all-inclusive or of the clean surplus relationship variety, where all prior-year adjustments, extraordinary items and asset revaluation surpluses are passed through the profit and loss account. Hence, if the clean surplus relationship can be upheld, accounting numbers can provide an appropriate basis for valuation subject to being forecast to infinity, so that any accounting method effects 'wash-out'.

Walker (1997), and Walker and Wang (2001) further argue, that the following key issues require attention in the determination of future residual income:

- Micro-economics of the firm.

  In general, structural Residual Income models have not attempted to identify the main type of micro-economic shocks that impact residual income. Specifically, no reference is made to the distinction between demand and supply conditions, shocks that are specific to the individual accounting entity, and shocks that affect the entire industry.

- Competitive Forces

Competitive interaction of the firm with firms in the same industry needs to be incorporated in the assessment of residual income since competitive forces eventually drive residual income towards a long run equilibrium level of zero.

Walker and Wang come to the conclusion that it is possible to improve the structural Residual Income models by separating out the demand and supply sides of a firm's operations. They further indicate that there are reasons to expect that many of the demand side shocks are unrelated to supply side shocks.

As a result of the working of competitive forces and the fact that residual income tends to move towards the industry mean, Lee, Myers and Swaminathan (1999), as well as Copeland, Koller and Murrin (2000) lean towards a two-stage approach in the measurement of returns. During the first stage, the growth rate of residual income is determined based on the expected growth of the individual firm. The second stage provides the terminal value, which attempts to capture the reversion of the firm's long-term returns to the industry average. Fama and French (2000) find that using a simple partial adjustment model, the rate of mean reversion is about 38% per year. However, specific situations occur, and they find that the rate of mean reversion is higher when profitability is far from its mean in either direction. The finding of Fama and French implies that the first stage should span a period of around 3 years.

Within the context of economic profit models, the present value of the value created each year going forward, over and above the cost of capital, is used as

the determinant of returns. In itself, this is similar to the use of discounted residual income in the Residual Income models. The return measures used in an Economic Profit model are either Return On Invested Capital (ROIC = Net Operating Profit Less Adjusted Taxes/Invested Capital) which provides a ratio as the end result, or Net Operating Profit Less Adjusted Taxes (NOPLAT), expressing the return as an amount (Copeland, Koller and Murrin (2000)).

1.4. Measuring Capital

Having established that returns may usefully be defined as earnings that exceed the required rate of return on capital, the next step consists of the identification of the capital base that is available to the firm to generate the return. For any type of organisation, the total capital base consists of equity capital and long-term debt. Similar to other organisations, the main sources of capital for banks are:

- Equity Capital;
- Long-term Debt;
- Short-term Debt.

Besides equity and debt, banks further have the funds of current and deposit account holders at their disposal that are used to finance operations. Although, as Merton and Perold (1993) state, this results in the situation that customers can be major liability holders, these funds are not considered part of the capital base of a bank, but should rather be viewed as what they are, the source used to fund loan and investment operations.

This statement also holds for venture capitalists and investment banks, where part or all of the invested funds are managed at the investor's (the client's) own risk, like discretionary portfolios and mutual fund investments. Even though the level of input in the investment decisions varies with the type of investment, and all revenues minus fees are credited directly to the mutual fund or the client, these funds are also considered to be part of the liability management of the bank, rather than forming part of the bank's capital base.

Merton and Perold (1993) argue that capital should include an allowance for risk, and define risk capital as the smallest amount that can be invested to absorb losses in the value of the firm's net assets relative to the risk-free financing of these net assets. When determining the value of a company, the importance of risk adjustment is eminent. However, the risk adjustment of capital defined by Merton and Perold (1993) and others such as Kimball (1997), can realistically only be applied at a business unit level. Adjusting capital for risk at an aggregate level based on financial statements is challenging if not entirely impossible, amongst other reasons due to diversification effects within the firm that off-set different risks taken by various departments. Although banks are obliged to adjust aggregated capital for risk in order to meet capital adequacy requirements, this is not necessarily the same capital base that is used to determine the value of a company.

1.5. Measuring the Cost of Capital

The cost of capital is defined as the opportunity cost of capital for the firm's existing assets (Brealey, Myers and Marcus (2003:321)). In order to estimate

the cost of capital, the different components of capital need to be considered. Owing to the fact that equity and debt capital have different characteristics, each demands a different required return. When making investment decisions, the firm will normally base itself on the total available capital, and not make the distinction between debt and equity components. As a result, the cost of capital is generally expressed as the Weighted Average Cost of Capital (WACC) in equation (2), which provides an approximation of the total cost of capital.

$$WACC = r_{capital} = r_{debt}(D/(D+E)) + r_{equity}(E/(D+E)) \qquad (2)$$

where r: Required return (on capital, debt or equity)

E: Market value of Equity

D: Market value of Debt

In order to enable international comparison, the cost of debt should be calculated on an after tax basis, which results in the effective cost of debt being calculated as r_{debt}(1-tax rate).

Whilst the market value of equity of a listed company can be determined relatively easily based on the share price quoted in the financial markets, the perceived market value of unlisted debt might be more difficult to determine. One of the ways to address this is to use the bond prices quoted in the financial markets for a company with the same characteristics and creditworthiness. On the other hand, the book value of debt can quite often provide a reasonable approximation of value as long as no major changes in the perceived

creditworthiness occur. The interest rate of fixed rate debt can then be used as an approximation for the required return on debt.

Whether it be the cost of equity or the cost of debt, the required return is not only determined based on market conditions, but also on the perceived risk of the investment. Hence, if WACC is estimated correctly, it can be used as an appropriate risk adjusted discount factor.

Contrary to the generally accepted notion that the cost of capital is determined based on a risk adjusted rate to reflect the risk level of the firm, Feltham and Ohlson (1999) argue that rather then amending the discount rate, the expected future abnormal earnings should be adjusted to reflect the risk of an investment (i.e. converted to certainty equivalents). As a result, it is then possible to discount the expected future earnings using the term structure of the risk-free spot rate as a discount rate rather than having to estimate future risk-adjusted rates. The main finding of this research is that no arbitrage in dividends is equivalent to no arbitrage in current book value and anticipated abnormal earnings. It is also found that in accounting measures dividends play no particular role. The benefit of this approach is determined to be that it shifts the focus away form the distribution of wealth (dividends) to accounting measures of the creation of wealth (book value and abnormal earnings), and wealth creation depends solely on a firm's operations as opposed to the financing of those operations.

1.6. Determination of Value

The value of a company at a particular point in time is a function of its rate of return, capital, and cost of capital. However, the value at a particular point in time does not directly provide an indication of the value created during a certain period. The value created during a certain period of time consists of earnings (including dividend) over and above the cost of capital employed.

Within the valuation framework not only the current earnings are of interest, but also whether these earnings can be sustained (growth) and the risk taken in order to obtain the earnings. Two main streams of valuation models are considered. On the one hand, we find the Economic Profit models, which include the Residual Income model, Economic Value Added, and Ohlson's Clean Surplus model (Ohlson (1995)). On the other hand, there are the Discounted Cash Flow models, which are based on either expected dividends or expected free cash flow.

Regardless of the model chosen, the estimation of expected future economic profit, dividends, or free cash flow needs to incorporate an element of growth as well as economic circumstances and competitive forces as suggested by Walker and Wang (2001). Furthermore, Clubb (2002), Lundholm and O'Keefe (2001, 2001a) and Penman (2001) all conclude that Residual Income models and Cash Flow based models are mathematically equivalent, and that, if applied correctly, each of the models will provide exactly the same valuation.

Each of the models can be specified either to provide the valuation of a firm, in which total capital (equity + debt) is used as a basis for the value of the firm as a whole, or to provide the valuation of a firm's equity, in which case only the firm's equity capital is used as a basis. The choice between total capital and equity capital determines the capital base, the earnings cash flow stream, and the discount rate used in the model.

2. *Comparison of Models*

Following the outline of the components of valuation of a firm, the two main streams of valuation models that have been determined are reviewed in light of their individual advantages and disadvantages. Subsequently, the specific issues that distinguish banks are considered in order to determine the model most suitable to determine the value of banks.

The selected model is then used as a basis for the valuation of Islamic Banks. The main advantage of using the same model as a basis is that the valuation of both types of banks can then be measured in a comparable fashion.

2.1. Economic Profit Models

The main characteristic of Economic Profit models is that they calculate a periodic spread between the Rate of Return on Capital and the Cost of Capital. A variety of Economic Profit models exist, the main ones being Residual Income, Economic Value Added, and Ohlson's Clean Surplus model (Ohlson (1995)), which is a type of Residual Income Model.

2.1.1 Residual Income Models

The Residual Income valuation model for equity as defined by Lee, Myers and Swaminathan (1999) as well as Frankel and Lee (1998) is represented in the following equation:

$$V^e_t = B^e_t + \sum_{i=t+1}^{\infty} \frac{E_t[(NI_{t+i} - (r_e * B^e_{t+i-1})]}{(1+r_e)^i} \quad (3)$$

where B^e_t is book value of equity at time t, $E_t[..]$ is the expectation based on information available at time t, NI_{t+i} is the Net Income for period $t+i$, B^e_{t+i-1} the book value of capital at the start of the period $t+i$, and r_e the required return on equity.

In order to provide a firm valuation rather than an equity valuation, as is the case in equation (3), the model can further be adjusted to:

- Reflect the use of risk-adjusted cost of capital to the firm (WACC) rather than just the required return on equity and;
- Incorporate economic profit or residual income.

$$V^f_t = B^f_t + \sum_{i=t+1}^{\infty} \frac{E_t[((\text{Earnings before interest but after taxes})_i - (WACC * B^f_{t+i-1}))]}{(1+WACC)^i} \quad (4)$$

where $E_t[..]$ is the expectation based on the information available at time t, B^f_t is the book value of the firm at time t, and B^f_{t+i-1} the book value of the firm's capital at the start of period $t+i$. V^f_t, represents the value of the firm at time t, incorporating both debt and equity capital.

Equation (4) attempts to represent the consensus view which indicates that the value of a company is not based on a single notion of dividend, cash flows or earnings, but is a combination of current book value and future expected residual income, discounted at the WACC to reflect the risk-adjusted cost of

capital. Frankel and Lee (1998) find that this model has a high predictive power, especially using longer specific forecasting periods.

The models represented in equations (3) and (4), determine the value of a company as the value of invested capital plus the present value of the stream of differences between (accounting) earnings and a charge for the use of capital.

In contrast, Feltham and Ohlson (1999) adjust the expected future residual income component for risk instead of capital. The expected residual income will then have to be discounted using the term structure of the risk-free spot rates. Provided that the risk adjustment is applied correctly in both situations, the resulting value of the firm should approximate the value determined using equation (4).

Residual income forms the basis for the majority of the other models. The main disadvantages of Residual Income models are related to forecasting the infinite time horizon and the use of accounting numbers. Myers (1999) researches the use of residual income in the context of linear information dynamics as defined by Ohlson (1995) and Feltham and Ohlson (1995). Myers finds that when estimated as a time series, linear information models do not provide significantly better value estimates than book value alone. Myers argues that theoretical models of the residual income time series seem to significantly underestimate the market's expectations of future residual

income, which is for instance due to systematic understatement of the value of operating assets.

The main disadvantage of using Residual Income models is, similar to Dividend Discount models and Free Cash Flow models, related to the fact that these models contain an element of expectation, and that expectations are generally classified as unobservable. Myers' (1999) research overcomes this issue by examining the relation between a firm's value and currently observable variables, hence eliminating the need to estimate any possible influence of unknown future developments. Frankel and Lee (1998) measure the value of equity using a Residual Income model and find that when using the I/B/E/S consensus earnings forecasts to proxy for market expectations of future earnings, the resulting estimate of firm fundamental value provides strong predictive power and reduces the subjective element of expectation.

Walker and Wang (2001) find a significant difference between the theoretical and practical application of Residual Income models. Contrary to the practical application, the theoretical Residual Income models are lacking a main component by focussing on the analysis of an individual firm, largely ignoring competitive advantage as a valuation component. As Walker and Wang indicate, Porter's five forces framework (Porter (1980)) provides the theory on the conditions under which an industry as a whole will be able to generate sustainable profits above normal profit levels. When evaluating the value of an individual firm within an industry, it is therefore of importance to assess the sustainable growth of the industry as well as the competitive position of the

firm within the industry. The adjustment for competitive advantage further enhances the practical usability of the Residual Income model.

Lee, Myers and Swaminathan (1999) find that when estimating company values over the period 1963 – 1996 traditional market multiples such as the Price/Earnings and price-to-book ratios have little predictive power. However, in a value-to-price ratio (V/P, where V is value and P is price), V is based on a Residual Income model, using the risk-free rate of return adjusted for risk to estimate WACC or the required return on equity as a discount factor. The V/P ratio is found to have statistically reliable predictive power.

Finally, the Residual Income models derive the returns from the balance sheet and income statement, with forecasts based on the notes to the accounts. This situation further enhances the practical use of the model as a tool for financial analysis.

2.1.2. Clean Surplus Models

The Clean Surplus Models as defined by Ohlson (1995) and Feltham and Ohlson (1995) are based on the Residual Income model, but discard the use of accounting based earnings and dividends *per se* as value drivers. Instead, these models are characterised by the requirement that all changes to shareholders' equity, other than dividends and transactions with shareholders, should be passed through the income statement.

Stark (1997) argues that clean surplus earnings may have a fundamental valuation role, but only if clean surplus earnings combined with book value and dividends are sufficient to forecast future clean surplus earnings and cum dividend book value. At the other extreme, Stark argues that one of the earnings components may be irrelevant for valuation purposes in the situation where it does not assist in predicting future values. Stark therefore concludes that it seems unlikely that clean surplus earnings automatically have a fundamental role in corporate valuation. Earnings persistence is considered of higher importance than the immunity of clean surplus earnings from the effects of accounting choices. Furthermore, clean surplus earnings require an infinite specific forecasting period, whereas residual income is expected to revert to zero as a result of competitive forces over a period of around 3 years (Fama and French (2000))

Walker (1997) has identified the following advantages of the Clean Surplus model:

- Serves to refocus attention on fundamental valuation issues, and has revived interest in models that attempt to explain firm valuation directly rather than correlating earnings surprises with returns;
- Forces the analyst or researcher to account explicitly for the impact of retained earnings on future earnings;
- Assists in providing a more coherent theoretical framework for traditional market-based studies;
- Renews focus on profitability analysis as a framework for the valuation of equities.

On the other hand however, Walker also identifies a number of disadvantages with the Clean Surplus model, amongst which:

- Practical problems in implementing the approach due to the fact that in various countries substantial deviations from clean surplus may exist;
- The approach does not explain why firms bother to report earnings and book values in the first place. Black (1980) for instance argues that deviations from clean surplus accounting occur because this makes reported earnings a more valuable signal;
- Accounting and disclosure choices are assumed to be independent of firm value;
- The firm's life span is assumed infinite and stable. Mergers, liquidation and formations are ignored, as well as the issue of when reversion of residual income to zero may be expected to occur;
- Abnormal earnings are assumed to follow a stationary stochastic process.

For a variety of reasons such as the infinite time horizon over which the abnormal earnings need to be estimated, the Clean Surplus models as defined by Feltham and Ohlson (1995) do not appear to have any practical following among researchers.

An additional complexity with the practical use of the Clean Surplus Relation is related to the suggested use of risk adjusted earnings rather than adjusting the cost of capital for risk (Ohlson (1995)). Ohlson argues that rather than adjusting the cost of capital to a rate reflecting the levels of risk taken by the investor, the earnings should be adjusted for risk to 'certainty equivalents'. As

a consequence, it is then possible to discount the cost of capital at the risk-free rate of return, taking account of the yield curve. However, this implies that the individual earnings components need to be converted to certainty-equivalents, which, as Copeland and Weston (1992: 403-406) argue, results in the situation that for an *n*-period project, an *n*-period infinite-state dynamic programming problem must be solved. This is contrary to the Residual Income models in which the cost of capital is risk-adjusted using an overall assessment of the perceived risk of the investment as a whole. As a result, Residual Income models avoid the practical issues related to the determination of certainty-equivalents. On the other hand, Residual Income models do, according to some researchers, require a clean surplus approach, since departure from clean surplus removes the mathematical relationship whereby $V_t = B_t + PV(RI)_{t+i}$ over the remaining life of the firm, since in a competitive environment, residual income (RI) reverts to zero over time. Once it can be assumed that residual income approaches zero, it's contribution to the Present Value equals zero and can be ignored.

Ohlson (1990) argues that in relation to the Clean Surplus Relation, linear information dynamics seem essential to obtain prices. Further research by Myers (1999) concludes that studies that modify the linear information models in an attempt to better approximate economic conditions frequently have internal inconsistencies as a result. Myers further finds that simple time-series models of Residual Income do not require internally inconsistent assumptions, although it does appear that the time series is non-stationary, a situation that is

due to changes in growth rates, accounting procedures and production technologies.

2.1.3. Economic Value Added

Economic Value Added (EVA) as developed and trademarked by Stern Stewart (Stewart (1990)) is based on the more general measure of Economic Profit, and is, in its simplest form, defined as follows:

$$\text{EVA} = (r - c^*) \text{ x Capital} \tag{5}$$

where r represents the rate of return, and c^* the Weighted Average Cost of Capital.

EVA is based on the Residual Income model, where operating profits are reduced by a charge related to the use of capital. In further development of EVA, Stern Stewart identifies a total of 164 adjustments that are required in order to 'correctly' estimate net operating profits and capital. The underlying reason for these adjustments is to compensate for what Stewart identifies as shortcomings in the accounting approach. Stewart's objective is to create a superior valuation measure.

Besides the fact that 164 adjustments appear to result in an unmanageable model since the data required is often not directly available on the balance sheet, income statement, or notes, further research also finds that EVA does not significantly outperform other models. Biddle, Bowen and Wallace (1997) find that earnings outperform EVA in explaining stock returns and firm values

and that although Stern Stewart's adjustments for accounting 'distortions' show some marginal evidence of being incrementally important, this difference does not appear to be economically significant. Peterson and Peterson (1996) arrive at a similar conclusion and further note that value-added measures suffer from size-bias, and that even adjusted for size, these measures do not adjust for events outside the control of management such as general market movements. However, Peterson and Peterson conclude that a move toward economic profit in itself is positive since it allows managers to concentrate on value creation rather than on accounting numbers.

Bernstein and Pigler (1997/1998) find little evidence that suggests that companies with a high EVA outperform the market, and argue that a high EVA is not necessarily related to high stock returns, hence may not be an appropriate indicator of value. They find that a return on investment in excess of the capital requirements is only worthwhile if it drives increasing profitability and profit growth. Bernstein and Pigler further researched growth in EVA in relation to stock prices. In this respect they find that growth in EVA does not appear to be able to accurately estimate the stock market value of a company.

Biddle, Bowen and Wallace (1998) suggest a number of reasons why EVA performs poorly in comparison with accrual earnings in explaining stock returns and firm values, especially given that it does appear to incorporate certain adjustments consistent with economic notions of income and firm valuation. Among others, they identify the following possible causes:

- EVA may be a good proxy for economic profits, but may not outperform the current realisations of other valuation measures;
- Estimates of the charge for capital and accounting adjustments may contain measurement error relative to what the market is using to value firms;
- Data required to compute EVA are not easily estimated;
- Adjustments may remove accruals that market participants use to infer firms' future prospects.

2.2 Discounted Cash Flow Models

Discounted Cash Flow (DCF) models determine the value of a company as the present value of all expected future cash distributions discounted at the opportunity cost of capital. Fernandez (2001) argues that DCF models are best positioned to value a company since the value of the company's equity, assuming going concern, arises from the company's capacity to generate cash flows for the equity shareholders.

Two main types of DCF model can be distinguished, the Dividend Growth Model (DGM) and the Free Cash Flow Model (FCF), which are both based on the discounting of an expected future flow at the required return.

Dividend Growth Model

The Dividend Growth model uses the level of dividend, expected growth in dividends, and an appropriate discount rate to determine the value of the firm, where generally explicit forecasts of dividend are used for the short-term

forecasting period in combination with a Continuing Value for the going concern as represented in equation (6):

$$P_0 = \frac{Div_1}{(1+r)} + \frac{Div_2}{(1+r)^2} + \ldots + \frac{Div_t}{(1+r)^t} + \frac{Div_{t+1}}{(r-g)(1+r)^t} \qquad (6)$$

where P_0: Price at time 0

Div: Dividend

r: Required return

g: Growth

The value of the firm is then calculated as the price (P_0) times the number of shares. Jacobs and Levy (1988) find in their research that on an ex-post basis, DGM has a positive but statistically insignificant relationship to observed reported returns when considered on its own. They demonstrate that DGM appears to be just another equity attribute and may be amenable to prediction.

Free Cash Flow Model

This model is similar to the DGM represented in equation (6), but replaces the expected future dividend stream with the expected FCF to the firm, which are in turn discounted at the appropriate discount rate.

The main question arising in the context of Discounted Cash Flow models is which cash flow series (dividends or free cash flow) best represents the expected future earnings stream and thus the value of the firm.

Sloan (1996) argues that both dividends and free cash flow have serious limitations, and neither measure incorporates how changes in future business conditions are expected to affect the future cash distributions.

Regardless of whether dividends or free cash flows are used, the main driver of the Discounted Cash Flow model is that the expected value of the firm is arrived at by discounting the expected cash flows at the firm's cost of capital (i.e. benchmark). Within the Discounted Cash Flow framework, the determination of the cost of capital is as important as the determination of expected future cash flows or earnings.

2.3. Valuing Banks

> "Banks remain among the most difficult companies to value despite the multitude of regulatory and reporting requirements imposed on them. It is hard to determine the quality of their loan portfolio, to figure out what percentage of their accounting profits results from interest-rate mismatch gains, and to understand which business units are creating or destroying value."
>
> (Copeland, Koller and Murrin (2000: 437-438))

Besides the above mentioned difficulties that are encountered when attempting to value a bank, there are other factors that increase the complexity of determining value such as income from other investments; existence of off-balance sheet instruments; and understanding which business units drive the bank's profit potential. Union Bank of Switzerland (UBS, 2002:102) has defined a Value Based Management (VBM) framework to overcome these issues. The aim of VBM is to create an understanding of the sources and drivers of value within all of UBS's businesses, and to integrate this

understanding into its management processes and principles, translating the value creation mindset into action. Boyd and Gertler (1994) argue in this respect that since a significant part of a bank's profit is generated by off-balance sheet activities, the accounting data should be amended to reflect income from these sources (e.g. guarantees, private placements, securitisation). Further, as Heffernan (1996:31) mentions, banks, unlike other firms, are required to maintain a certain percentage of their capital relative to their assets, adjusted for risk.

Copeland, Koller and Murrin (2000) are of the opinion that the most suitable approach to determine the value of a bank is to use the equity approach, in which the expected future Residual Income or Free Cash Flow attributable to equity are discounted at the cost of equity. The conceptual reason for this choice originates from the fact that liability management, and the subsequent potential to create value, is part of the operational activities of the bank. This results in a situation where any form of capital which is not equity, should not be considered as purely financing. They argue that if the cost of attracting deposits is less than the cost of raising an equivalent amount of funds with equal risk in the open market, a positive spread is created which in turn creates value for shareholders. This might not be true for subordinated debt held as regulatory capital against market risk, which should realistically be considered part of the bank's capital.

Hirtle (1991) on the other hand argues that both debt and equity capital are relevant when determining the ability of banks to be effective competitors.

Hirtle finds that individual institutions that are perceived as more risky will tend to face a higher cost of acquiring capital, but also that at a more fundamental level, the cost of capital reflects macro economic factors such as household savings behaviour, the stability of the macro economy, the pattern of relationships among banks, corporations, and government, and, to some extent, the corporate tax structure. The advantage of a lower total cost of capital is an important factor in the ability of banks to maintain a continuing presence in highly competitive global and national product markets.

Kimball (1998), in line with Copeland, Koller and Murrin (2000), also solely considers equity capital for banks in researching the use of economic profit measures versus ROE for banks. Kimball finds that on a business unit level, managers maximising ROE or the difference between ROE and a hurdle rate or benchmark (opportunity cost of capital) will pick only the project with the highest ROE and not those with a ROE below that, even though the others might also generate economic profit for the firm. Selecting lower ROE projects would reduce average ROE for the manager, which the manager will seek to avoid. As a result, the firm will tend to underinvest and grow more slowly than it should. Solomons (1965) argues that a manager maximising Economic Profit would invest until the last project selected generated a ROE just equal to the opportunity cost of capital employed. On an aggregate level, the implications of this situation are that the overall level of profitability of the firm using ROE is lower than it could have been if all projects with a positive economic profit would have been implemented.

Kimball argues that economic profit measures force bank managers, and hence on an aggregate level the bank, to include the opportunity cost of equity when making investment and operating decisions. However, as Kimball argues, it is possible to improve Economic Profit for banks in three different ways:

1. Increase adjusted earnings through improved margins or additional sales;
2. Decrease equity capital used by the unit;
3. Decrease cost of equity.

As a result, the usability of a single measure of economic value added is questionable and, although economic value added is conceptually appealing, ambiguities that surround its calculations indicate that no single measure of economic profit is able to capture all subtle complexities, neither on a business unit level nor on the aggregate level.

The remainder of this section details the specific characteristics of banks in relation to return, capital, and cost of capital that need to be taken into consideration when applying a valuation model to banks.

2.3.1. Return

Off-balance sheet instruments such as guarantees, derivatives and letters of credit generate a significant part of the returns of banks. As a result, expected returns related to both on- and off-balance sheet items need to be considered when determining the total return of a bank. The potential total liability related to off-balance sheet instruments is not recorded on the balance sheet, and information to enable the calculation of risk, average return and yield needs to

be extracted from the notes to the financial statements. The ability to estimate these items is highly dependent on both the level and the quality of disclosure.

The earnings of a bank as reported on the income statement generally include all realised and unrealised earnings as of the balance sheet date, and could therefore be used to determine the current level of earnings. However, under the current accounting standards (IAS 39 and IAS 21), the following items do not have to be processed via the income statement, but either may be or must be directly incorporated in equity on the balance sheet:

- Remeasurement gains and losses resulting from Marked-to-Market (MtM) revaluations of financial assets available for sale, which may directly be incorporated in equity on the balance sheet. The choice whether to incorporate these gains and losses directly in the balance sheet pending disposal, or process them via the income statement needs to be applied consistently;
- Currency translation gains and losses on net investments in foreign entities must be incorporated in equity on the balance sheet until the disposal of the investment.

As a result of the above mentioned, the Clean Surplus Relation is violated until the disposal of the net investment takes place or the trading position in a financial instrument available for sale is liquidated. An adjustment to arrive at the Clean Surplus Earnings might therefore be required.

In order to establish potential future earnings and hence the value, the notes to the financial statements need to be analysed carefully to determine the expected future growth.

For banks and non-banks alike, competitive advantage (Walker and Wang (2001)) needs to be considered when determining the sustainability of growth and the growth rate, which are required to determine the value of a going concern.

2.3.2. Capital

The majority of research in the area of valuation for banks appears to favour an approach where only equity is used as the capital base. For a significant part, this is due to the fact that a bank's debt is related to liability management and should not be considered purely as financing. Other sources of funds (e.g. deposits) are, in line with the consensus found in the majority of research, considered not to be part of the capital of the bank. Although some researchers argue that the cost of these funds is based on the perceived risk a depositor is taking, this will be reflected in the overall net earnings. A similar approach can be taken towards subordinated debt, with the possible exception of subordinated debt specifically issued to meet capital requirements. Subordinated debt issued as a pure source of funds can be considered as operational and hence should be excluded from capital, and the related costs will be deducted in the calculation of earnings. However, subordinated debt issued to meet capital requirements should be included in the capital of the

bank. Owing to the fact that it might be difficult, if not impossible to distinguish between these types of subordinated debt, it will be considered as operational for this study, and not as part of capital.

Excluding subordinated debt further facilitates the comparison of Islamic banks and conventional banks since Islamic banks do not issue subordinated debt.

2.3.3. Cost of Capital

As a consequence of the above, the cost of capital of a conventional (non-Islamic) bank comprises the required return on equity. The required return on equity, a bank's main source of capital, needs to be determined based on the perceived risk levels compared to other institutions in the same industry.

2.4. Applicable Model for Banks

Identifying the most superior valuation model for any type of institution appears complicated, mainly due to the fact that each of the individual models has its own advantages and disadvantages attached to it.

The majority of empirical research in the general area of valuation of a firm concludes that Residual Income, or Economic Profit, type models, the oldest and both in theory and practice one of the most tested types of models, still continue to provide the most accurate results when determining the value of a firm. As Clubb (2002) concludes, fundamental valuation analysis based on residual income estimation may generally be a more useful focus for equity

valuation than cash flow analysis, although this is subject to a prudent examination of the cash flow implications of such valuations. Although each of the models described has specific advantages and disadvantages, in general, the conclusion from previous research is that, if applied correctly, each of the models will provide exactly the same equity valuation.

As stated earlier, the main issues that occur with the Residual Income or Economic Profit type models are related to forecasting the infinite time horizon, and the possibility that the forecast may contain an element of subjective expectation, which is generally classified as unobservable. The Ohlson version of the Clean Surplus model on the other hand, which is essentially a one-period model, raises issues in the form of the parameters for earnings persistence and the use of linear information dynamics. Clean surplus earnings are considered to be immune to accounting method choices but in the Clean Surplus models, forecasting of earnings for the remaining life of the firm is required. Residual Income on the other hand is considered to be mean reverting as a result of competitive forces, and revert to zero after around 3 years, thus reducing the need to specifically forecast for a longer time period.

In general, it can be concluded that Residual Income Models are favourable since they can easily be applied using accounting data, require estimates for a smaller number of variables, and provide a better valuation measure than EVA or Clean Surplus models.

Taking the specific characteristics of banks into consideration, and using only equity capital as the capital base, the Residual Income model as defined in equation (7) below, which represents a variety of the Residual Income model as defined by Lee, Myers and Swaminathan (1999), as well as the model defined by Frankel and Lee (1998), is deemed to be the most suitable model to determine the value of banks, where 'Earnings' are understood in the normal sense of earnings for equity.

$$V^e_t = B^e_t + \sum_{i=t+1}^{\infty} \frac{E_t[(\text{Earnings}_i - (r_e * B^e_i)]}{(1+r_e)^i} \qquad (7)$$

In this model, the required cost of equity capital (r_e) is assumed to remain the same for the going concern, and will not change over the lifetime of the bank. The issues related to the forecasting of an infinite time horizon can be addressed by the introduction of a Continuing Value. Lee, Myers and Swaminathan (1999), as well as Frankel and Lee (1998), and Copeland, Koller and Murrin (2000), define a two-stage approach, where during the first period, the growth rate of residual income is determined based on the expected growth of the individual firm, and the second stage provides the Continuing Value, which attempts to capture the reversion of the long-term Residual Income to the industry average.

Copeland, Koller and Murrin (2000:273) argue that with an explicit forecast period of 5 years, 79% of the value estimate will be based on the Continuing Value, and only 21% on the explicit forecast. The longer the explicit forecast period, the lower the relevance of the Continuing Value estimate. This is mainly related to forecasting for individual firms, where the forecasted

residual income is dependent on individual growth factors, and not to large samples of firms.

Frankel and Lee (1998), by contrast, use a 3-year period since after this period the reliability of estimation of earnings and other parameters declines at an increasing rate, and also due to the fact that consensus forecasts for 3 years are available from the I/B/E/S database. They do however recognise that the horizon for expected additional growth needs to be taken into consideration. Lee, Myers and Swaminathan (1999) indicate that the Continuing Value has to attempt to capture the reversion of long-term returns to the industry average. As already noted, Fama and French (2000) find that the rate of reversion to the industry mean is about 38% per year. In the optimum situation, the explicit forecasting period should comprise a full economic cycle.

Based on the consensus found in empirical research, the length of the first, specific, forecasting period would generally be around 3 years. After that, forecasting would become increasingly difficult and the introduction of forecasting errors is likely. As Penman (1998) argues, the Continuing Value calculation serves to correct the error introduced by truncating the forecast horizon. This error arises not only because forecasts beyond the time horizon are omitted in the truncation, but also due to errors in the forecast up to the horizon.

Adjusting the model, will then give:

$$V^e_t = B^e_t + \sum_{i=t+1}^{3} \frac{E_t[(\text{Earnings}_i - (r_e * B^e_i)]}{(1+r_e)^i} + \frac{CV}{(1+r_e)^3} \qquad (7.1)$$

where CV represents the Continuing Value at the time horizon of 3 years, and is discounted back to t=0.

The Continuing Value will be calculated for the going concern, using the long-term expected growth rate as represented in the equation (8):

$$CV = \frac{RI_3 * (1+g)}{(r_e - g)} \tag{8}$$

where *g* represents the expected long term growth rate. The resulting model, in which the Continuing Value at the end of year 3 is discounted at the cost of equity, is then represented in equation (9):

$$V^e_t = B^e_t + \left(\sum_{i=t+1}^{3} \frac{E_t[(Earnings_i - (r_e * B^e_i)]}{(1+r_e)^i} \right) + \left(\left(\frac{RI_3 * (1+g)}{(r_e - g)} \right) \Big/ (1+r_e)^3 \right) \tag{9}$$

Frankel and Lee (1998) however, determine the Future Return on Equity (FROE) estimations, and use the I/B/E/S long-term expected growth for the third specific forecasting period. As a result, the third specific forecasting period can be used to substitute for the Continuing Value component of the equation.

3. *Cost of Capital*

The ability to measure the value of a firm on a stand-alone basis provides an indication of the overall value, but remains a relative concept as long as there is no comparison to other companies in the same industry or market place. One of the main benchmarks in valuation is the cost of capital of a firm in relation to the cost of capital of the market portfolio as a whole. Owing to the fact that for banks capital constitutes solely of equity, there is no requirement to determine the Weighted Average Cost of Capital. In stead, the cost of equity, which is defined by the required return on equity, suffices. The main models to determine the required return on equity, being the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT) are discussed in further detail.

3.1. The Capital Asset Pricing Model

One of the most common benchmarks of financial performance is the Capital Asset Pricing Model (CAPM) which is developed based on Markowitz' (1952) expected return – variance (E-V) hypothesis. Markowitz developed the E-V hypothesis based on the rules that an investor (i) maximises discounted expected, or anticipated, returns and (ii) considers expected return desirable and variance of return undesirable. Markowitz then identified the Capital Market Line (CML), an efficient frontier on which, in equilibrium, all optimum, diversified portfolios are positioned. Sharpe (1964), Lintner (1965) and Mossin (1966), developed CAPM, which is defined as a utility function of investor preferences. CAPM replaces the Capital Market Line identified by

Markowitz (1952) with the Security Market Line (SML), which is a graphical representation of the CAPM benchmark.

The following assumptions are generally used in deriving CAPM (Black (1972)):

1. Investors have homogenous expectations regarding the possibilities of various end-of-period values for all assets;
2. Common probability distribution describing the possible returns on the available assets is joint normal;
3. Investors choose portfolios that maximise their expected end-of-period utility of wealth;
4. Investors may take long or short positions of any size in any asset, including the riskless asset.

CAPM is represented in the following equation:

$$r_e = r_f + \beta(r_m - r_f) \tag{10}$$

where r_e is the expected return on the security, r_f represents the risk-free rate represented by Treasury Bills or other government paper, r_m is the market rate of return and β indicates the systematic (undiversifiable) risk of the investment in comparison with the market (see equation (11)). In equation (10), the market risk premium is represented by $(r_m - r_f)$. Owing to the fact that β determines the systematic risk level of an asset compared to the overall market, it has a significant role in estimating the cost of capital.

An investor's optimum portfolio can consist of a variety of combinations of risk-free and risk bearing assets or, alternatively, a combination that consists of risk bearing assets in combination with risk-free borrowing to finance additional risk bearing assets. However, for an investor to hold a long position in a risk-bearing asset, a risk premium is required to offset the additional risk taken. The risk premium is not necessarily positive, but can be negative for a holding that is negatively correlated with other holdings reducing the return variance of the overall portfolio. In this case, the systemic risk is also negative and reduces the overall risk level of the portfolio.

Given the fact that the CAPM is based on an estimate of the equilibrium return on the market portfolio ($E(R_m)$), one of the purposes of the risk factor used in CAPM (β) is to determine the systematic risk level of an asset compared to the overall market, which can then be used to estimate the risk premium and hence the cost of capital for an individual asset. β is calculated as follows:

$$\beta_j = \frac{\sigma_j}{\sigma_m} (Corr(j,m)) \qquad (11)$$

β is defined as the standard deviation of an individual asset relative to the standard deviation of the market, multiplied by the correlation co-efficient between the return on the risky asset *j* and the market *m*. For the market as a whole, β equals 1.0.

CAPM heavily relies on the efficient market hypothesis, which, in its simplest form, states that security prices fully and unbiasedly reflect all publicly and

privately available information. This 'strong' version of the efficient market hypothesis is based on the precondition that information and trading costs, which represent the cost required to get prices to reflect all information, are always nil. Jensen (1978) argues that a weaker (i.e. semi-strong), but economically more plausible version of the efficient market hypotheses states that prices reflect information to the point where the marginal benefits of acting on information (i.e. the profits to be made) do not exceed the marginal cost.

Since CAPM is designed to determine the equilibrium in the market, it is as such often tested in a joint-hypothesis with market efficiency. Fama (1970, 1991) and Banz (1981) correctly argue that if empirical testing leads to invalidating the efficient market hypothesis, this may be due to the fact that the efficient market does not exist, but may just as well be related to the incorrect definition of the equilibrium as represented by CAPM. In addition, Roll (1977) states as one of the problems related to the testability of the model that the theory cannot be tested unless the exact composition of the true market portfolio is known and used in the test.

3.2. Arbitrage Pricing Theory

Empirical tests conducted by Fama and French (1992) lead to the conclusion that during the period 1926 – 1968 there is a simple positive relation between average return and market β. However, in further research spanning the period 1963 – 1990, they find that this relationship no longer exists, hence invalidating CAPM. Fama and French use the 'Fama-MacBeth' regression,

which is defined by Fama and MacBeth (1973), the result of which was consistent with the multifactor asset-pricing models of Merton (1973) and Ross (1976). Based on their findings, Fama and French concluded that there is a rational asset-pricing framework on the relation between average return and size and the book-to-market equity ratio.

The multifactor asset-pricing models expand CAPM with additional factors to which each security is more or less sensitive, and measure the sensitivity of an asset's returns to each additional factor with an individual factor-β.

Merton (1973) introduces a factor based on the findings of Black, Jensen and Scholes (1972) to address the issue that portfolios constructed to have zero covariance with the market, had average returns that significantly exceeded the riskless rate. This result suggests that besides the riskless rate and the systematic risk determined by CAPM, there is more than one other factor that systematically affects the return of the market.

Various research has been done to establish which additional factors may influence cross-sectional returns on common stocks. Banz (1981) concludes that, in addition to market β as in CAPM, a relation exists between market value and common stock returns. He does not, however, find any clear reason why the size effect exists, and suggests that it may find its roots in behavioural finance theories. It can for instance be argued that the amount of information is a function of firm size, and the larger the firm, the more information is available. Investors tend to translate lesser amounts of information into higher

risk levels, and could therefore be less inclined to invest in, or to require higher returns from, smaller firms. Banz further identifies that the size effect found might also be a proxy for one or more true but unknown factors related with size.

In line with the result of Banz' research, Fama and French (1992) find that when they allow for variation in β that is independent of size, the resulting β leaves a large size effect in average returns. They further find that although equity returns are inversely related to the size of a company measured by the value of its equity capitalisation, they are positively related to the ratio of the book value of the company's equity to its market value.

Basu (1983) on the other hand concludes that common stock returns appear to have a relation to earnings yield and firm size. Firms with a high Price/Earnings (P/E) ratio, which implies a low earnings yield, seem to have earned on average higher risk-adjusted returns than the common stock of firms with low P/E ratios. Basu found the effect to be significant even after experimental control was exercised over differences in firm size, and concluded that the size effect virtually disappears when returns are controlled for differences in risk and P/E ratios. Basu further argues that the strength of the earnings yield effect seems to vary inversely with firm size, due to which it cannot be attributed to earnings information effects. Neither P/E nor size were found to be able to clarify expected returns, due to which it is likely that both variables are just proxies for more fundamental determinants of expected returns for common stocks.

Bhandari (1988) has tested the relation between returns and the debt/equity ratio and found a positive relationship when controlling for β and firm size.

As mentioned earlier, Fama and French (1992) also tested the use of CAPM β when explaining stock returns. They found that even though in the period 1926 – 1968 a positive linear relation exists between average return and market β, this relationship does not hold for the period 1963 – 1990, during which β is not sufficient to explain stock returns and variance in returns. They conclude that besides the market β, both size and book-to-market value of equity are relevant when determining returns on common stocks. These results are consistent with the multifactor asset-pricing models of Merton (1973) and Ross (1976).

The main issue that needs to be addressed in relation to the multifactor asset-pricing model is which factors to incorporate. It is possible to incorporate factors that do not have any inherent explanatory value themselves, but are included solely due to the fact that they fit the data presented. Furthermore, there is a risk that an additional factor added to the model may adversely affect the explanatory value of other factors.

Based on empirical research, company size and the book-to-market ratio of common equity appear to be the most likely factors to be included, although other factors like consumption figures (Breeden (1979)) have also been investigated. The advantage of incorporating company size and the book-to-market ratio of common equity is that they are relatively easy to measure. On

the other hand, individual factor βs need to be assigned representing the sensitivity of a firm to these factors.

Cox, Ingersoll and Ross (1985) integrate real and financial markets in one model, forming the basis for the Arbitrage Pricing Theory (APT). The following factors are most generally used in the APT:

1. Industrial production index;
2. Short term real rate;
3. Short term inflation;
4. Long term inflation;
5. Default risk.

The resulting model is displayed in the following equation:

$$r_e = r_f + \beta_1(r(f)_1 - r_f) + \beta_2(r(f)_2 - r_f) + \ldots + \beta_n(r(f)_n - r_f) \qquad (12)$$

where $r(f)_n$ represents the expected rate of return on the market portfolio in relation to the n^{th} factor, which is independent of all other factors, and β_n represents the sensitivity of the stock return to this factor. However, it needs to be considered that, as Fama (1991) argues, multifactor models may lead researchers to search the data for variables that, *ex post*, describe the cross-section of average returns (i.e. data mining or data snooping).

3.3. Efficient Market Hypothesis

Both CAPM and APT find their basis in the efficient market hypothesis, which states that all available information is directly incorporated in the price

of a security. Three forms of the efficient market hypothesis can be distinguished (Copeland and Weston (1992)):

1. Weak-form efficient market

   No investor can earn excess returns by developing trading rules based on historical price or return information.

2. Semi strong-form efficient market

   No investor can earn excess returns from trading rules based on any publicly available information.

3. Strong-form efficient market

   No investor can earn excess returns using any information, whether publicly available or not.

Results of event studies have indicated that on average stock prices tend to adjust quickly to information about investment decisions, dividend changes, changes in capital structure, and corporate control transactions, hence supporting the semi-strong form of the efficient market hypothesis. However, the majority of the event studies have been executed in American and European markets, where value-relevant private information appears to be rare, and where markets are classified as semi-strong form efficient. In weak-form efficient markets prices do not fully reflect all public information, and hence may be more susceptible to rejection of CAPM, unless it is possible to measure the sensitivity of the market portfolio to public information, and add this as a factor to a multifactor asset-pricing model. Fama (1970) notes that in early treatments of the efficient market model, the statement that the current price of a security 'fully reflects' all available information was assumed to

imply that successive price changes, or one-period returns, are independent and identically distributed, forming the basis for the Random Walk model of weak-form efficiency. The Random Walk model states that the entire distribution is independent of the information available. Initial studies on efficient markets were further concerned with weak-form efficient markets in which the information subset of interest is just past price (or return) histories. Only when extensive testing appeared to support the efficiency hypothesis at this level, did research move on to semi-strong and strong form tests.

3.4. Determination of the Cost of Capital

From empirical research it appears that rejections of both CAPM and APT are never clean, and there is always a possibility that rejection of CAPM is due to an incorrect proxy for the market portfolio and the resulting poor estimates of the market β. On the other hand, size and book-to-market value of equity appear to have explanatory power over and above the market β, which provides a reason to suggest that the multifactor asset-pricing model is better situated to provide a benchmark than CAPM. Fama (1991) indicates that CAPM and the multifactor models are not mutually exclusive, and can be viewed as different ways to formalise the asset-pricing implications of common general assumptions about tastes (risk aversion) and portfolio opportunities. Fama and French (1997) find a R^2 of 0.76 for banks on CAPM for the period 1963 – 1994, hence rendering CAPM a useful estimator.

Even though both CAPM and APT have disadvantages, they are still the most widely accepted models to determine the risk level of an asset or company in

relation to the overall market portfolio. The relative simplicity of CAPM, in relation with the fact that incorrect choices of factors may easily invalidate the APT, render CAPM to be the most suitable model to determine the required return on equity for this study, in both the semi strong-form efficient markets in which conventional banks operate as well as the (at best) weak-form efficient markets in which Islamic banks are listed. For conventional banks that operate in efficient markets, the components of CAPM are readily available from sources such as Datastream.

Tomkins and Karim (1987) argue that the Capital Market Line could be used as a measure of the cost of capital for Islamic banks, but that the risk-free rate should be set to 0 instead of the market rate. This is more in line with the market model, which only considers the slope of the CML, and allows the intercept to find its own level. However, this does not necessarily imply an intercept of 0%. Furthermore, Islamic banks operate in the same market as conventional banks, and therefore it can be argued that CAPM would provide a suitable measure, especially when looked at comparison between conventional and Islamic banks. Furthermore, the nominal risk-free rate of return used in this research contains an element of inflation adjustment, which should be taken into consideration for Islamic banks as well.

For countries in which Islamic banks are incorporated, the components of CAPM are not easily available, and have to be estimated differently. The risk-free rate of return can be estimated based on the International Fisher Effect (Brealey, Meyers and Marcus (2003:623)), which states that the real interest

rates in all countries should be equal, with differences in nominal rates reflecting the differences in expected inflation. This implies that the risk-free rate of return for countries in which Islamic banks are incorporated can be determined based on the risk-free rate in the United States, adjusted for the inflation differential. The use of the US risk-free rate of return follows logically from the fact that for the majority of countries in which the Islamic banks that are part of this research are incorporated, the exchange rate of the local currency is pegged to the US dollar.

The estimation of market rates in emerging markets is more complex since indices are often not available, and if available can be classified as unreliable. In the majority of empirical research (e.g. Bruner, Conroy, Li, O'Halloran and Lleras (2003), Conover, Jensen and Johnson (2002), and Barry, Peavy and Rodriguez (1997)) the Emerging Market Database (EMDB) and related indices produced by the World Bank are used. They find that these indices provide a good indication of the market rates of return in emerging markets, and enable the comparison with strong efficient markets. For some of the countries these market indices are available from Datastream (MSCI World Index), or directly from the local central banks or stock exchanges. For others, the data been estimated. Individual βs are not available, and are estimated using the average β for conventional banks.

4. *Islamic Bank Specifics*

> "Islamic banks were developed on a foundation that does not permit the separation between temporal and religious matters. That foundation requires compliance with *Shari'a* for all aspects of life. [...] Accordingly, Islamic banks are founded on the concept of sharing profits and losses consistent with the Islamic concept of "profit is for that who bears risk". Islamic banks reject interest as a cost for the use of money and loans as an investment vehicle."
>
> (AAOIFI (2002:26))

The source of guidance for Islamic principles is the *Shari'a*, the Islamic law of human conduct. Tomkins and Karim (1987) state that the *Shari'a* outlaws *riba* based on the specific statement in the *Qur'an* that "trading is permitted and usury is forbidden". Although *riba* literally translated means usury, it is universally interpreted as the prohibition of charging any interest. One of the main reasons for the prohibition of interest is that it concentrates wealth and promotes inequality through exploitation. Profit sharing, however, is seen as an appropriate basis for economic transactions between the supplier of capital and the entrepreneur, and regarded as an appropriate alternative to interest.

Because of the requirement to comply with *Shari'a* and the resulting absence of interest, Islamic banks not only use different modes of financing, but also different means of attracting depositors. These differences are reflected in the structure of the balance sheet and need to be taken into consideration when applying a valuation model to Islamic banks. Rosly and Bakar (2003), find that it is possible to compare the value of conventional banks and Islamic banks using Return On Assets. However, the majority of the banks in their sample are 'Islamic Bank Departments' of mainstream banks, which results in

additional issues related to the fact that in this case part of the overheads are borne by the bank and not necessarily allocated to the Islamic Bank Department, hence resulting in a lower cost base and a higher Return On Assets.

Where conventional banks attract and place funds with a view to generate monetary profits, Islamic banks operate based on the principles of the *Qur'an,* which results in the avoidance of interest and speculation. Islamic banks mobilise funds on an interest-free basis. The Islamic bank takes on the role of a partner in the investment, rather than the more facilitating role conventional banks take. Within the framework of the *Qur'an*, investment decisions are based on the underlying economic principles of the investment, and the involvement of the bank is therefore to a lesser extent 'at arms length' than is the case in conventional banks. This may result in additional concerns in the context of agency theory, which is a subject for further research. In *Mudaraba* and *Musharaka* investments Islamic banks, and therefore their investment account holders, do not just provide funds but are considered as partners in the investment project. This has an impact on how the bank operates, and hence on both the assets and the liabilities of the bank.

In addition to the prohibition of *riba*, the *Shari'a* also prohibits speculation and hoarding. Financial speculation is equated to gambling, and prevents Islamic banks from, among others, taking out forward contracts even in the form of a hedge. It is argued that financial speculation leads to gains and losses without increasing the usefulness of exchanged goods. The underlying

logic related to hoarding is that this would result in society having fewer resources in use than there are available. Therefore hoarding deprives the needy of available assistance (Tomkins and Karim (1987)). It needs to be stated though that the Islamic law does not advocate equalisation of wealth, and that it does recognise that personal wealth creation is a motivating factor in the economic process. The Islamic law solely requires that the wealthy circulate their wealth to increase production for others as well as themselves.

Other issues mentioned in this chapter, such as risk and the length of the financial year, are also considered.

All Islamic finance related terms used in this research are clarified in the glossary.

4.1. Sources of Funds

Islamic banks typically have current accounts, restricted investment accounts, unrestricted investment accounts and equity capital as sources of funds. Restricted and unrestricted investment accounts are also known as profit sharing investment accounts (PSIA). As will be clarified in this section, the balances of unrestricted investment account holders have characteristics of both equity investment funds and deposits.

4.1.1. Current Accounts

Current accounts are similar to the current accounts of a conventional bank. Islamic banks guarantee the balances on these accounts from the equity of shareholders, but do not pay any interest or other return on their balances.

4.1.2. Investment Accounts

Investment accounts are either classified as Restricted or Unrestricted profit sharing accounts (Restricted PSIA and Unrestricted PSIA). Restricted PSIA are funds placed with the bank for investment purposes specifically indicated by the account holder. Unrestricted PSIA are funds placed with the bank to be invested at the discretion of the bank. In both cases the funds are managed by the Islamic bank as an investment manager based either on a *Mudaraba* contract or an agency contract (*Wakala*). The difference between Restricted and Unrestricted PSIA is that the funds of a Restricted PSIA need to be invested as specified in the contract, and cannot be commingled with other funds available to the bank. In contrast, the Islamic bank is permitted to commingle its own assets with those of the Unrestricted PSIA holders, which it has the right to use or dispose of (AAOIFI (2002:30-31)).

Payout to both Restricted and Unrestricted PSIA depends on the profitability of the investments, and unless the bank has been guilty of misconduct or negligence, holders of investment accounts bear the full risk of loss to the magnitude of their accounts if the returns on the aggregate asset portfolio investments are negative.

According to AAOIFI, balances of Restricted PSIA are not assets of the bank and should only be reflected in the financial statement as off-balance sheet or contingent items. Under no circumstances does the bank have the right to use or dispose of the investments made using funds of unrestricted PSIA, except within the conditions of the contract between the Islamic bank and the holders of Restricted PSIA. (AAOIFI (2002:36)). However, not all the banks apply these rules in the same way. For instance, one bank in the sample treats all investment accounts as off-balance sheet. The allocation of the profits paid to the investment account holders as well as to the bank is agreed within the contract between the bank and the accountholder.

4.1.3. Unrestricted Investment Accounts

Equity of Unrestricted PSIA is the amount remaining from the original funds received by the Islamic bank at the date of the financial statement, plus or minus their share in the profits or losses and decreased by withdrawals or transfers to other types of accounts. Equity of Unrestricted PSIA is not considered a liability for the purpose of financial accounting, because the bank is in case of a loss not obligated to return the original amount of funds received form the account holders unless the bank is guilty of misconduct or negligence (AAOIFI (2002:31-32)).

Unrestricted PSIA are conceptually different from accounts held with conventional banks since they share in the profit and are not paid a pre-agreed, either fixed or floating, interest percentage. As a result, the participation of Unrestricted PSIA holders in the operational results of the bank is higher than

with conventional banks, and displays more characteristics of equity. It appears to be common practice among Islamic banks to smooth the financial returns to PSIA by varying the percentage of profit taken by the bank as the *Mudarib* share.

4.1.3. Equity Capital

Equity capital consists of funds raised by the bank through the sale of common shares to the public and includes any reserves attributable to shareholders accumulated by the bank over the years (Al-Deehani, Karim and Murinde (1999)). This definition is similar to the definition of equity capital for conventional banks.

4.2. Sources of Income

One of the main sources of income for conventional banks is Interest Income, a type of income that is absent in Islamic banks. Instead, Islamic banks offer specific types of finance, for instance in the form of *Murabaha* for resale of goods on credit, *Istisna'a* for pre-finance of the production of specified items like aircraft, large equipment, or construction contracts, or *Ijara'h* which represents a form of leasing.

Although depending on the funding structure, a major source of income for Islamic banks consists of the management fees in the form of the *Mudarib* percentage of profits of PSIA.

4.3. Structure

Although similar to conventional banks, the activities of an Islamic bank typically comprise a combination of retail, wholesale and investment banking, the structure of Islamic banks differs from conventional banks. Çizakça (1996) states that Islamic banks can, to a certain extent, be compared with Venture Capitalists, with the difference that Islamic banks offer various forms of Islamic financing as additional activities. This statement, however, only holds for specific banks in the Islamic banking industry like First Islamic Investment Bank, whose primary objective is to facilitate private equity investments.

The relationship between shareholders and holders of restricted and unrestricted PSIA is governed by the *Mudaraba* contract, according to which one party (the *Rabb al Mal* – the investment account holder) supplies funds to an entrepreneurial party (the *Mudarib* – the Islamic bank) for investment purposes. The profit that results from operations funded by investment accounts is divided between the bank and the investment account holders according to the ratios agreed in advance in the contract. In case of a loss, the *Mudarib* receives no remuneration, but does not share in the loss.

In general, the balance sheet of an Islamic bank is structured as represented in table 2 below:

Assets	
Cash and cash equivalents	
Sales Receivables	*Istisna'a* *Murabaha* *Salam*
Profit and Loss Sharing Investments	*Musharaka* *Mudaraba*
Leased Assets	*Ijara'h*
Fixed Assets	

Liabilities, unrestricted investment accounts and owners' equity	
Due to Central Bank	
Current Accounts	
Unrestricted Investment Accounts including related reserves	
Proposed Dividends	
Shareholder's Equity	Share Capital Reserves Retained Earnings

Off-Balance Sheet
Restricted Investment Accounts
Commitments and Contingent Liabilities

Table 2: Islamic Bank Balance Sheet Structure

Furthermore the following items can be encountered:

- *Qard al Hassan* Loan for which only the principal is repayable. For example used for study or marriage. *Qard al Hassan* is incorporated on the asset side of the balance sheet.

AAOIFI is suggesting that in addition a separate statement is introduced to account for these loans as part of the financial statement;

- *Zakah* — Annual religious alms applied to wealth in the form of liquid assets at the rate of 2.5% or 2.5775% of the value of assets, depending on whether the financial year is based on the lunar or the solar calendar. *Zakah* can only be used for charitable purposes.

Not only the balance sheet, but also the statement of profit and loss differs from conventional banks. In general, the statement of profit and loss of an Islamic bank contains the items represented in table 3 below:

Income	
Profit Sharing Income	*Musharaka* *Mudaraba*
Mudaraba fees	
Lease Income	*Ijara'h*
Other Income	
Less: Income attributable to investment account holders	

Expenses
Operating Expenses

Table 3: Islamic Bank Statement of Profit and Loss Structure

The operating expenses of Islamic banks are similar to those of conventional banks and consist of items such as personnel, premises and equipment, and depreciation. Although income attributable to investment account holders is typically reported on the income side, some banks report this item as an expense. Few banks do not report income attributable to investment account holders as a separate item at all, but only report the net income.

In general, the financial statements of Islamic banks are a lot less transparent than those of conventional banks. However, the enhanced transparency of the financial statements of conventional banks is a reasonably recent development. In Europe, the 1989 Second Banking Coordination Directive (89/646/EEC) still allowed banks (at national discretion) to maintain hidden reserves up to a maximum of 4% of total assets. Only with the more recent introduction of more stringent accounting and reporting rules has the transparency of financial statements of conventional banks increased.

4.4. Risk

The absence of interest, and hence of interest rate risk as such, does not imply that an Islamic bank can be considered to bear lower levels of risk. Different types of risk can be identified for Islamic banks in the form of changes in asset and liability returns, and value due to changing economic circumstances affecting the investments that are part of the portfolio of the bank. Although Islamic banks do not face fixed-rate interest rate risk, which is a balance sheet (fair value) exposure, they do face a rate of return risk, which is an income statement (cash flow) exposure, similar in nature to floating-rate interest rate

risk in conventional banks. Rate of return risk is mainly related to sale-based instruments such as *Murabaha, Salam,* and *Istisna'a* as well as *Ijara'h* instruments. Although the risk are considered to be small for short-tenor *Murabaha* contracts, the risk increases with longer tenors. One of the risk mitigation techniques in use is to link *Ijara'h* rentals to a benchmark such as LIBOR or an inflation index and periodically adjust the rental amounts.

In order to properly measure the risk of an Islamic bank, conventional bank risks need to be replaced by other risk types that cater specifically for the risks undertaken by Islamic banks. Besides the above mentioned rate of return risk, AAOIFI (1999) identify the following two sources of risk, which are described in further detail by Archer and Karim (2001):

- Fiduciary risk:

  Risk related to the nature of the *Mudaraba* contract, which places liability for losses on the *Mudarib* in case of malfeasance, negligence or breach of contract on the part of the management of the *Mudaraba*.

- Displaced commercial risk:

  This risk type is related to the common practice among Islamic banks to 'smooth' the financial returns to investment account holders by varying the percentage of profit taken as the *Mudarib* share.

Sundararajan and Errico (2002) further consider operational risk as crucial in Islamic Banks, and use the CAMELS framework (Capital, Assets, Management, Earnings, Liquidity, and Sensitivity to market risk) to identify the various differences in risks between conventional and Islamic banks. They conclude that the riskiness of Islamic banks is higher than conventional banks,

for instance due to the profit-and-loss sharing modes of financing and the related increased potential for moral hazard, the potential incentive for risk taking without adequate capital levels, the lower levels of risk-hedging instruments and techniques, and underdeveloped or nonexistent capital markets.

Although the types of risk differ between conventional and Islamic banks, the required return on equity will in both cases be dependent on the perceived risk levels in comparison with the risk of the overall market.

4.5. Financial Year

The financial year of an Islamic bank can be based either on the lunar or the solar calendar. The lunar year consists of 12 lunar months of on average 29 days, 12 hours, 44 minutes and 2.8 seconds (Webster's Dictionary of the English Language (1990)). As a result, for a bank that uses the lunar calendar, the financial year will only constitute of 354 (or once every three years 355) calendar days, as opposed to those banks using the solar calendar where the financial year constitutes of 365 (or in leap years 366) calendar days. This needs to be taken into consideration when estimating and forecasting expected future earnings and the cost of capital.

4.6. Growth

Within the Residual Income framework, dividend growth is often used as a proxy for the expected earnings growth. Islamic banks do not appear to follow a dividend growth policy. Instead, their dividend payout seems to be

dependent on a number of factors, one of them being the payout to investment account holders. From an initial high-level overview of financial statements of Islamic banks, it appears that for payout to investment account holders a growth policy is often maintained, which is in general sustained out of the profit equalisation reserve. However, in case of overall reduced income growth, the payout to unrestricted PSIA may be done at the expense of the *Mudarib* share and potentially the dividend payout to shareholders. As a result, the dividend payout ratio appears to be inconsistent, invalidating sustainable growth estimations for Islamic banks based on a dividend growth assumption.

5. *Research Objective and Research Method*

This chapter outlines the research objective, the related hypotheses, an overview of the known issues that may provide difficulties in the research design and how they will be addressed, research method, and research methodology.

5.1. Research Objective

Residual Income or Economic Profit models have two different functions. Firstly, these models can be used to evaluate periodic performance; secondly they can be applied to determine the value of a company at a certain point in time. For the purpose of this research, the models are used to determine the value of conventional and Islamic banks at a certain point in time.

The resulting research objective is to establish that the models can, to a significant degree, capture cross-sectional differences in the stock-market values of conventional banks, and can also be applied to determine the value of Islamic banks as long as the parameters of the model are estimated in such a way that differences in capital and asset structure are taken into account.

The overall objective of this research is to determine the feasibility of applying current Residual Income or Economic Profit valuation models in such a way that they can cater for the specifics of an Islamic bank without violating the basics of the model.

The value of a company is the cumulative result of its financial performance. In theory, the first difference in value between the beginning and end of a period provides a measure of financial performance, since it measures the value created represented by the change in the value of equity (V^e). However, in order to provide an indication of performance, a comparison between the values at time *t* and time *t*-1 is required. The suitability of the Residual Income model to measure financial performance is out of scope of this study, the Residual Income model used in this study establishes the levels, or equity value, at a particular point in time, not the first differences in value between one period and the next. Frankel and Lee (1998) have tested the model to determine its usefulness in predicting cross-sectional stock returns in the US, and they found that the V^e_t estimates of this model using I/B/E/S consensus forecasts are highly correlated with stock prices, which were used as the benchmark.

5.2. Hypotheses

The research objective can be transcribed in three hypotheses. The null hypothesis is defined as follows:

H_0: For banks there is no relation between accounting measures of value and the stock market measure.

The alternative hypothesis is then:

H_1: The defined Residual Income model can, to a significant degree, capture cross-sectional differences in stock market value of conventional banks over a significant period of time.

If H_1 is supported, the next hypothesis is related to the feasibility of applying the Residual Income model to Islamic banks, and is defined as follows:

H_2: Even though both capital and asset structures of Islamic banks differ from those of conventional banks, and limitations are imposed by the fact that Islamic banks operate in emerging markets, the defined Residual Income model can to a significant degree be used to provide an indication of the value of an Islamic bank and provide the ability to rank them.

The null hypothesis (H_0) will be accepted if the results of the data analysis for conventional banks lead to the conclusion, with a confidence level of 95%, that there is no relation between accounting measures and the stock market measure, the latter being represented by the market price.

H_0 and H_1 are both tested for the predictive value of the model for cross-sectional stock returns, where the stock returns are represented by the market price. For the majority of the Islamic banks, however, stock market data are not available. Where stock market data are available, it is at best weak-form efficient, and hence stock market returns are not reliable. If H_1 is accepted with a confidence level of 95%, the Residual Income model will be applied to Islamic banks. The average value created for conventional banks will be used as a benchmark in order to determine whether the Residual Income model can be used to provide an indication of the feasibility of applying the model to Islamic banks. Where required, proxies will be used for Beta and the market rate of return for Islamic banks.

The model used provides the value of equity at a particular point in time. In order to provide an indication of the value created in a certain period, a comparison between the values at time *t* and time *t*-1 is required. Comparison of V^e_t versus V^e_{t-1} provides the change in the levels of value over time, but is potentially subject to double counting and serial auto-correlation due to the fact that V^e_t is based on book values of previous periods. The actual value created in a certain period of time consists of earnings (including dividend) over and above the cost of capital employed, which is the residual income component of the model (earnings in excess of the cost of capital).

5.3. Issues

A variety of issues occur when determining how to apply the Residual Income model to Islamic banks and the testability of the model for Islamic banks. A few are generic, but most issues specified below are specifically related to the environment in which Islamic banks operate.

5.3.1. Financial Data Availability

Historically, merchant banks were established to support national and international trade, and have over time evolved to the conventional banking industry in its current form. Although interest-free finance has long been practiced in the same way as the merchant banks that were the predecessors of conventional banks, the first Islamic bank only started operations in 1975. As a result, the historic time series for Islamic banks are limited. Furthermore, although the number of Islamic banks has shown steady growth since 1975, their numbers remain low, a situation that seriously impairs the construction of

a significant sample. The predictive power of the model is therefore potentially reduced, an issue that will need to be addressed by allowing for a higher number of degrees of freedom.

5.3.2. Market Data Availability

The most common form of testing valuation models is to compare the values determined using the Residual Income model to the market values. Islamic banks are often privately owned and not listed on any stock exchange, due to which market data such as Beta and price are not available. Islamic banks that are publicly owned are mainly listed on stock exchanges located in the Gulf countries (e.g. Bahrain and Kuwait), and Malaysia. The majority of these markets can at best be regarded as weak-form efficient (Bruner, Conroy, Li, O'Halloran, and Lleras (2003)) and the markets are relatively thin. As a result, the share prices are not completely reliable as a benchmark. However, can be argued that share prices generally follow a random walk, which implies that prices appear to wander randomly regardless of what has occurred on previous days (Brealey, Myers and Marcus (2003:162-163)). Although the high variability in returns of emerging markets found by Barry, Peavy, and Rodriguez (1997) can in part be attributed to currency fluctuations and policy changes, not all fluctuations can be explained. It therefore appears that the random walk theory also applies to emerging markets.

This issue does not apply to conventional bank sample, which consists of banks listed on efficient markets. Besides, the majority of research (e.g. Black (1980), and Penman (1996)) concludes that on a portfolio basis, accounting

models are highly correlated with stock market models. Owing to the fact that a portfolio of banks is used for conventional banks, estimation errors significantly reduce, and the market price will remain a good benchmark. Provided that the accounting model holds for conventional banks, it can than be stated that, would stock market data be available, the same relationship between company value and market price would be observed for Islamic banks. The Residual Income model in itself will then be considered useful to determine the value of Islamic banks.

5.3.3. Accounting Standards

During its relatively short history, the Islamic financial industry has evolved, and is still evolving, from a new to a mature industry. One of the implications of this is that, as a result of the continuing development and adaptation of accounting standards, financial statements are subject to regular changes. A number of researchers (e.g. Penman (1996) and Black (1980)) argue that as long as the clean surplus relationship is maintained, a change in accounting policy does in theory not have an impact on the results of the valuation model. This argument can be sustained in the event the time series of Residual Income are explicitly forecast for the lifetime of the firm. It cannot be stated with certainty that this will also be the case in relation to the model for this research, which has a relatively short explicit forecast period in combination with a Continuing Value. The impact of changes in accounting standards will be addressed and, if required, information on the financial statements will be restated. The Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) was established to define a uniform set of accounting

standards for Islamic financial institutions. However, during the period covered in this research, these accounting standards were only enforced in Bahrain. In all other countries, the application of AAOIFI standards was voluntary during the period of this study, although recently Jordan, Sudan, and Qatar also enforce them.

5.4. Research Design

The research is divided into the following steps:

1. Test the Residual Income model for its ability to capture, to a significant degree, the cross-sectional differences in stock market value of conventional banks over a significant period of time;
2. Apply the Residual Income model to Islamic banks, taking their specifics into account;
3. Test the predictive value of the model for Islamic banks using the trend in average value and average price of conventional banks as a benchmark. Testing of the Residual Income model against market returns for Islamic banks is deemed to be an area for future research due to the lack of availability and reliability of market data.

5.4.1. The Model

The characteristics of banks in general and Islamic banks in particular need to be taken into consideration when determining the exact application of the model. The resulting model needs to provide the ability not only to determine the value of an individual Islamic bank, but also to determine the value of conventional banks. As a result, the model can be used to determine the value

of both Islamic banks and conventional banks as part of the overall financial industry.

Based on the conclusion that Residual Income models are appropriate since they can easily be applied using accounting data, require estimates for a smaller number of variables, and provide a better measure of value than Cash Flow or Dividend Discount models, the model used for this research is a variety of the Residual Income model as defined by Lee, Myers and Swaminathan (1999), as well as that defined by Frankel and Lee (1998). The explicit forecasting period will span 3 years after which a Continuing Value will be calculated for the going concern. The resulting model that will be used is represented in equation (9):

$$V^e_t = B^e_t + \left(\sum_{i=t+1}^{3} \frac{E_t[(\text{Earnings}_i - (r_e * B^e_i)]}{(1+r_e)^i} \right) + \left(\left(\frac{RI_3 * (1+g)}{(r_e - g)} \right) \Big/ (1+r_e)^3 \right) \qquad (9)$$

The assumptions underlying this model are that systematic risk levels as well as the riskless rate of return are assumed to remain constant over time for the going concern (represented by the Continuing Value), unless significant changes are expected in the perceived risk levels of the bank. As a result, for the purpose of this research, and in line with Frankel and Lee (1998), the third specific forecasting period is determined such that it can be applied as a substitute for the Continuing Value (see Appendix A for further details). Contrary to the individual forecasting period, where expected changes in the risk levels are taken into consideration in Beta, for the Continuing Value the riskless rate as well as risk level is assumed to remain unchanged. Unlike

Frankel and Lee, the historic book values are not calculated, but obtained directly from Datastream, since the book values provided by Datastream already represent the average book value per share over the period.

5.4.2. Estimating Parameters

The model as represented in equation (9) consists of four parameters for which estimations are required, being the book value of equity at time t (B^e_t), earnings, cost of capital (r_e), and the long-term growth rate (g). Capital is a function of the model and is equal to the book value of equity at the end of the year preceding the current forecast period.

5.4.2.1. Estimating Parameters for Conventional Banks

This section describes the definitions for the parameters for conventional banks.

Current Book Value

The current Book Value of equity is represented by the book value of owners' equity as reported on the balance sheet.

Earnings

Penman (1992), argues that net income to shareholders (earnings after dividend) is a good starting number for valuation since it is the 'bottom-line' number in the income statement, and provides a measure of change in value. Penman specifically excludes dividend from earnings due to the fact that dividends reduce future expected earnings. In order for the Clean Surplus

Relationship (CSR) to hold, all revenues and costs, including one-off items, must be passed through the income statement. Adjustments to incorporate revaluation results of financial instruments available for sale as well as currency translation gains and losses on net investments in foreign equity, which, according to IAS, may not pass through the Income Statement but are directly incorporated in equity, should be made if required.

Walker (1997) argues that accounting book values of earnings may yield superior explanatory value due to the fact that reported earnings reflect the rational investment choices of firms, and the assessments by the firm of capital expenditures that can be booked as assets. This leads to the conclusion that reported earnings provide a better association with market value then clean surplus earnings. Black (1980) also subscribes to this point of view. Stark (1997) demonstrates that the reporting of dirty surplus earnings is sufficient for valuation purposes and that it seems unlikely that clean surplus earnings automatically has a fundamental role in corporate valuation. Stark argues that clean surplus earnings are only valuation relevant when the individual components of clean surplus earnings have additional predictive ability, but that in general the breakdown of clean surplus earnings into its individual components has no information content.

The Clean Surplus Relationship applies to forecasted earnings in infinity. Owing to the fact that the model in this study has a short, 3 year, explicit forecasting period, in combination with the findings by Walker and Stark referenced above, earnings for conventional banks will consist of the income

attributable to shareholders in the form of both retained earnings and dividend, and the Clean Surplus Relationship will not be upheld.

Capital

For banks the main source of capital consists of equity supplemented, in some cases, by subordinated debt issued to meet capital requirements. Owing to the fact that it might be difficult, if not impossible, to distinguish the component of subordinated debt issued to meet capital requirements from the component issued as a pure source of funds, subordinated debt will, for this study, be considered as operational and not as part of capital. Excluding subordinated debt further facilitates the comparison of conventional and Islamic banks since Islamic banks do not issue subordinated debt.

Equity capital is determined at year *t*, but is not explicitly forecasted for every following year unless significant changes in equity capital are expected besides the expected growth in retained earnings.

Cost of Capital

Due to the fact that only equity capital is used to determine the value of a bank, the cost of capital consists solely of the required return on equity capital. All other costs of funds are considered to be normal operating costs and are deducted from income when deriving the earnings figure. CAPM is used to determine the firm-specific discount rate. For conventional banks in an efficient market, this will be an appropriate way to determine the discount rate given a certain level of systematic risk. The Arbitrage Pricing Theory (APT),

which is developed on the basis of CAPM but includes additional factors, will not be used in this research. Owing to the fact that in this research the Residual Income is applied to a single industry there is no requirement for any additional parameters to be estimated. Furthermore, CAPM has, as discussed in Chapter 3, been shown to perform well in other research (e.g. Fama (1991), and Fama and French (1997)).

Growth rate

A specific forecasting period of 3 years is used to further enhance the comparability with Islamic banks, for which a lack of available data exists. During the specific forecasting period, the growth rate is determined using I/B/E/S consensus earnings forecasts as a proxy for market expectations of future earnings (Frankel and Lee (1998)). In line with Frankel and Lee, the third specific forecasting period is calculated in such a way that it also incorporates the Continuing Value.

5.4.2.2. Estimating Parameters for Islamic Banks

This section describes the definitions for the parameters for Islamic banks.

Current Book Value

Due to the fact that Unrestricted PSIA have characteristics of equity, the current book value of equity of Islamic banks can be represented by either the book value of owners' equity as reported on the balance sheet, or by the book value of owners' equity plus Unrestricted PSIA. For the purpose of this study, both definitions of current book value for Islamic banks will be tested in order

to determine which one provides the most appropriate valuation in combination with the appropriate definitions of capital and earnings.

Earnings

For Islamic banks, earnings can be viewed in either one of the following ways:

1. Income attributable to shareholders

   This is similar to the definition of net income for conventional banks, and is defined as the income attributable to shareholders after deduction of all operational costs as well as the profit share of Unrestricted PSIA.

   However, there is empirical evidence that it is common practice among Islamic banks to smooth the financial returns to PSIA by varying the percentage of profit taken as the *Mudarib* share (Archer and Karim (2001), and Al-Saddah (2000)). The implication of this is that although the overall return on invested capital remains the same, the percentage of returns to shareholders may in a given period be reduced in order to provide an acceptable return to PSIA. This may be inverted in a subsequent period. Although recently issued standards by AAOIFI (AAOIFI (2002)) are addressing this situation, the relative lack of transparency in the financial reporting of Islamic banks complicates the determination of net income.

2. Income attributable to shareholders and unrestricted investment account holders.

In this case, the smoothing practices mentioned under the previous option will not have any influence on the value of the bank, since they do not affect the overall return on invested capital. The implication is that Unrestricted PSIA need to be considered as equity.

For the purpose of this study, both definitions of earnings for Islamic banks will be tested in order to determine which one provides the most appropriate valuation in combination with the appropriate definitions of capital and current book value. Similar to conventional banks, the Clean Surplus Relationship will not be upheld when determining the earnings parameter for Islamic banks.

Earnings for Islamic banks need to be determined carefully. Two different types of profit sharing methods are applied by Islamic banks, the pooling and the separation method, which have an impact on reported earnings (Al-Deehani, Karim and Murinde (1999)). Under the pooling method all funds from shareholders and Unrestricted PSIA made available to the Islamic bank should share in all revenues and expenses with the exclusion of revenues generated by subsidiary and affiliated companies or the remuneration of the bank's directors and external auditors' fees. Under the separation method revenues and expenses of investment operations are segregated from those of the other banking services. Unrestricted investment account holders are allowed to share only in the revenues and expenses related to their investment in the former type. However, both unrestricted investment accounts and equity funds may be invested in the same investment portfolio.

Capital

In line with Copeland, Koller and Murrin (2000) it can be argued that capital in the form of current accounts should be treated as funds required to create value on the liabilities side of the balance sheet, and not as part of the capital base of the bank. In accordance with the AAOIFI standards (AAOIFI (2002)), restricted investment accounts are treated as off-balance sheet investments, and create value for the bank via the *Mudarib* share, but are not considered to be part of the bank's capital. Unrestricted PSIA provide a special case. Owing to the fact that funds of Unrestricted PSIA can be commingled with the banks capital, and investments take place at the discretion of the bank, Unrestricted PSIA have some characteristics of equity capital. On the other hand, Unrestricted PSIA can be compared with funds related to discretionary portfolio management in conventional banks, in which case they are not considered to be part of permanent capital. This is in line with the position adopted by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI (2002)), which defines owners' equity as follows:

> 'Owners equity refers to the amount remaining at the date of the statement of financial position from the Islamic bank's assets after deducting the bank's liabilities, equity of unrestricted investment account holders and their equivalent and prohibited earnings, if any. That is why owners' equity is sometimes referred to as the owners' residual interest'. (AAOIFI (2002:32)).

Based on this statement, investment accounts, whether restricted or unrestricted, would not be included in equity capital.

However, the equity characteristics of unrestricted PSIA in combination with the fact that the bank's profit objectives are concerned with remunerating

Unrestricted PSIA as well as shareholders, warrant Unrestricted PSIA to be included as capital in the valuation model. If the balance of Unrestricted PSIA is included in capital, they can only be included at book value due to the fact that they are not publicly listed.

For Islamic banks, both definitions of capital will be tested in this study, in combination with the previously given definitions of earnings. The combinations that will be tested are as follows:

1. Current Book Value = Owners' equity

   Capital = Owners' equity

   Earnings = Income attributable to shareholders including Dividend.

2. Current Book Value = Owners' equity + Unrestricted PSIA

   Capital = Owner's equity + Unrestricted PSIA

   Earnings = Income attributable to shareholders including Dividend + Income attributable to Unrestricted PSIA

Equity capital is determined at year *t*, but is not explicitly forecast for every following year unless significant changes in equity capital are expected besides the expected growth in retained earnings. Expected dividends are forecasted for the explicit forecasting period in order to determine the value of owners' equity.

Cost of Capital

For Islamic banks, which do not tend to operate in efficient markets, the determination of the appropriate cost of capital is challenging. However,

assuming the markets in which Islamic banks operate are weak-form efficient, it is still possible to use CAPM to determine the required return on equity and hence the cost of capital, since the required return on equity of the investor will be dependent on the perceived risk level in comparison with the overall risk levels of the market.

The cost of capital used is dependent on the estimation of capital, and can be determined as follows:

1. Capital =Owners' equity

   The cost of capital in this case consists solely of the required return on equity.

2. Capital =Owner's equity + Unrestricted PSIA

   The required return on capital for unrestricted PSIA differs slightly from the required return on capital for owner's equity, mainly due to the following (Archer and Karim (2001)):

   - The *Mudarib* share, which is calculated as a percentage of profits on PSIA and a major source of revenue for Islamic banks, is deducted to arrive at the return on unrestricted PSIA, and added to the return on owner's equity;
   - Unrestricted PSIA do not share in the bank's remuneration as Mudarib for managing restricted PSIA;
   - Unrestricted PSIA are not charged with a share of directors' and external auditors' remuneration.

The cost of total equity capital to the Islamic bank is in this case determined based on the earnings before allocation between shareholders and unrestricted PSIA.

Growth rate

Due to the absence of a dividend growth policy that can be used as a proxy for growth, the earnings growth rate is used as a proxy for sustainable growth estimations.

5.4.3. Value

The current value (V^e_t) resulting from equation (9) is considered to represent the value of the bank's equity given the future expectations for cost of capital, earnings, risk, and capital. Based on the efficient market hypothesis, this value should, for conventional banks, be approximated by the market price.

5.5. Research Method

> "Stock market behaviour is driven by investor sentiment as well as by clear-thinking rationality, and speculative action can drive market values away from fundamentals, and thereby away from the 'theoretically correct' estimation given by the valuation model." (Barker (2001:6)).

The model defined in this research is designed to provide a company value based on a long-term holding.

In order to test the first hypothesis, which states that Residual Income models can, to a significant degree, capture the value of conventional banks, market

data will be used in a regression analysis to estimate and test the accounting-based model. Regression analysis is concerned with the study of the dependence of one variable, the dependent variable, on one or more other variables, which are identified as the explanatory or independent variables, with a view to estimating and predicting the (population) mean or average value of the former in terms of the known or fixed values of the latter (Gujarati (2002)).

Equation (13) represents the basic, simple regression relationship (Gujarati (2002)):

$$Y = \beta X \tag{13}$$

where X is the independent or explanatory variable representing V^c_t, and Y is the dependent variable represented by the market price. β represents the slope of the regression relationship, or the rate of change in the market returns for every 1 unit of change in the accounting-based returns (V^c_t).

This relationship is further extended to incorporate the intercept or base value (β_1) and an error factor (ε), which is an unobservable random variable that can have positive or negative values and is known as the stochastic disturbance or stochastic error term:

$$Y = \beta_1 + \beta_2 X + \varepsilon \tag{14}$$

The type of data used for this analysis consists of time series data collected containing financial statement and market price information of conventional banks over the period 1991 - 2002 as described in further detail in the Research Data section. All banks included in the sample have data available for at least the period 1996 - 2002. Time series data needs to be collected at regular intervals. Since the year-end financial statements are audited, the interval used in this study will be annual.

For this study, a two-parameter regression model will be used in which the market returns are the dependent variable and the value of equity (V^e_t) resulting from equation (9) the independent, or explanatory, variable. The Method of Ordinary Least Squares (Thomas (1983), Gujarati (2002)) will be used to determine the values for β_1 and β_2.

For the second hypothesis, which states that it is possible to use the same Residual Income model to determine the value of Islamic banks, it is not possible to use a similar test due to the lack of market data. However, having established the explanatory power of the model, the average value created by Islamic banks in a period will be compared with the average value created by conventional banks.

5.6. Research Data

The total available sample for conventional banks is used in two ways. The sample is divided in two sub-sets, one estimation sample and one control sample to test the null hypothesis (H_0) and the alternative hypothesis (H_1).

This section provides a high level outline of how the samples for conventional and Islamic banks are determined.

5.6.1. Conventional Banks

The population consists of conventional banks listed on stock exchanges in information efficient markets such as *EURONEXT*, *LSE*, and *NYSE*. Although the use of a full set of data has the advantage that survivorship bias is eliminated, data on banks that are no longer operational cannot be obtained from Datastream. Datastream adjusts all data for potential differences in accounting standards, due to which the comparability of banks is enhanced. The dataset for this part of the study is constructed based on the following criteria:

1. A minimum of 5, and a maximum of 10 years of historical data are available for each of the banks in the population. Although older historical data is available for conventional banks, this is not the case for Islamic banks. The study will therefore use a 10-year time horizon for historical data for both datasets.
2. To facilitate comparison, only those institutions that have a listing for their banking activities are included. As a result, combined bank and insurance companies that have a single listing for both banking and insurance activities are excluded from the dataset.
3. All observations are taken at the same interval to facilitate panel data analysis, which is determined to be annual.
4. Significant merger and acquisition activity has taken place in the banking sector over the past 10 years. For any bank formed by the

merger of two or more institutions, the analysis is, where possible, performed on the combined observations for the period prior to the merger.

The H_0 and H_1 hypotheses are not only tested using the complete sample of 194 banks, but also using two separate sub-samples. In order to determine how the model best captures the market-based returns, an estimation sample and a control sample are constructed. Although Frankel and Lee (1998) restrict their sample to non-financial US firms, the result of their test is used to provide an indication whether the results of this study are in the same order of magnitude, and hence may provide an indication of the adaptability of the model in comparison to other industries. The sample has been analysed in order to ensure that it provides a realistic representation of the conventional banking universe, and that bias to a particular geographical area or size is minimised. The potentially impact of the final sample size of 194 on the validity is deemed an area for future research.

Banks that are part of the total population are, for instance, HSBC, ABN AMRO Bank, Citigroup, Deutsche Bank, Bank of America, and Barclays. Historical data for each of the elements in the sample is taken from Datastream, with I/B/E/S consensus forecasts obtained from the same source. Time series analysis (panel data) as well as cross sectional analysis is used to analyse the data using EViews version 4.1, a standard statistical software package, often used for this type of analysis. Given a standard normal distribution, the desired confidence level is determined to be 95%.

5.6.2. Islamic Banks

The population to test the second hypothesis is significantly smaller, and consists of Islamic banks for which historical data could be obtained from the financial statements of the banks themselves.

The qualification 'information efficient' cannot be assigned to this population since these banks are, if at all public, mainly listed on stock exchanges in the Middle East and Asia Pacific regions which are at best considered to be weak-form efficient markets. Furthermore, the number of Islamic banks for which a 10 year history is available is limited, which severely influences the population size. The results of this test will be subject to a higher number of degrees of freedom to address any bias resulting from the relatively small number of observations. A potential measurement error occurs due to the size and diversification of the sample population. Once more Islamic banks enter the industry and longer periods of historical data are available for a larger number of banks, future research will be required in order to determine the significance of the measurement error.

The 10 years of historical data has been obtained manually and constructed from year-end financial reports of the individual Islamic banks that are part of the sample. As for conventional banks, the interval of the individual observations is determined to be annual. However, due to the already restricted number of banks in the sample, for banks that use the lunar calendar an adjustment factor is introduced to enable comparison on an annual basis.

5.7. Validity and Generalisations

Although construction of a well-balanced sample enhances the statistical significance of the test results and related conclusions, the internal validity of this research is closely related to the data available to test the second hypothesis. The individual components of the model (e.g. capital and return on capital) all contain some form of noise, which in turn has an impact on the internal validity of this study.

As a result of the sample size and historic data availability, generalisations can only be made very carefully. Further research will be required to determine the validity of any generalisations. The external validity of the part of this research related to conventional banks can be considered high, since the results are in line with findings of similar studies for other industries.

6. *Application of the Model – Conventional Banks*

Although Residual Income models have been empirically tested for non-financial institutions, this has not yet been done for banks. The Residual Income model for conventional banks represented in equation (9) is used to determine the value of a bank at a specific period in time.

$$V^e_t = B^e_t + \left(\sum_{i=t+1}^{3} \frac{E_t[(\text{Earnings}_i - (r_e * B^e_i)]}{(1+r_e)^i} \right) + \left(\left(\frac{RI_3 * (1+g)}{(r_e - g)} \right) \Big/ (1+r_e)^3 \right) \qquad (9)$$

Using regression analysis on panel data, the percentage of the cross-sectional variations in market value that is explained by the model is determined.

6.1. *Sample Regression Function*

The Sample Regression Function (SRF) is determined based on the Population Regression Function (PRF) represented in equation (14):

$$Y = \beta_1 + \beta_2 X + \mu \qquad (14)$$

where X is the independent or explanatory variable representing V^e_t, and Y is the dependent variable represented by the total market value, which equals the market price multiplied by the number of shares. Based on the research by Frankel and Lee (1998), the value resulting from the Residual Income model in itself should be sufficient to explain the cross-sectional variations in total market value, and hence there should be no requirement for any further explanatory variables, such as firm size.

6.1.1. Determination of the SRF

The SRF is determined using the Ordinary Least Squares (OLS) method. The OLS method defines the best fit of the SRF in such a way that the sum of the sample residuals is as small as possible. The Sample Regression Line has the following properties:

- Passes through the sample means of Y and X;
- The mean value of the estimated Y is equal to the mean value of the actual Y;
- The mean value of the estimated residuals is zero;
- Residuals are uncorrelated with the estimated Y;
- Residuals are uncorrelated with the estimated X.

6.1.2. Quality of the SRF

Since data varies from sample to sample, estimates will change, which results in the requirement to measure the 'reliability' or precision of the estimate. The precision of the regression model is determined by its standard error (s_e).

The goodness of fit is determined by R^2, which measures the proportion or percentage of the total variation in Y explained by the regression model.

6.1.3. Statistical Package

The software used for analysing the data is EViews version 4.1 due to its ability to deal with cross-sectional analysis. Although EViews is not best suited to deal with panel data, in combination with cross-sectional analysis the package provides all the required tools.

6.2. Data Items

From the data items contained in Datastream, those listed in table 4 below have been used to calculate the value of a bank:

Data Item	**Description**
190	Dividend per share. This item is used to determine the plough-back rate and the related effect on the future book values.
305	Equity Capital and Reserves. This item is used in combination with the number of shares (NOSH) to determine Book value per share in the event item 1308 is not available.
625	Earned for ordinary. This is the net profit arrived at after deducting tax, minority interest and preference dividends, but before any post-tax as reported extraordinary items, allocation to reserves other than untaxed reserves and post tax disclosed extraordinary items.
1308	Book value per share
NOSH	Number of shares
F1MN	I/B/E/S consensus growth forecast, 1 year forward. Earnings per share
F2MN	I/B/E/S consensus growth forecast, 2 years forward
LTMN	I/B/E/S consensus long-term growth expectation. If not available, the value calculated in $FROE_{t+1}$ is used to proxy for $FROE_{t+2}$ (see appendix A for further detail on the calculations).
392	Total Assets
Beta	Annual average of monthly Betas provided by Datastream. The monthly Betas are based on daily data.
Risk-free rates (R_f)	Where available government bond rates as available from Datastream are used. In all other cases, Worldscope MSCI data is used, which is only available from 1995 onwards.
Market rates (R_m)	Market rates are obtained from Datastream, calculated as the difference between time t and time t-1. The main index in a country is used as the basis to determine R_m
Price	The market price at fiscal year-end.

Table 4: Datastream Data Items

With the exception of the Price, the data elements mentioned in table 4 are used to determine V^e_t using equation (9). Refer to appendix A for the determination of future return on equity (FROE) estimates and book values.

6.3. Sample

In order to estimate the SRF as closely to the total population as possible, a large sample of banks has been used, all listed on what are considered to be efficient stock markets in the United States and Europe. Banks in Japan have not been included since no financial statement data is available. All data for conventional banks has been selected from Datastream using the following initial selection criteria:

1. Location: United States and Western Europe
2. Industry: Banks
3. Sub-sector: Banks

As defined in chapter 5, combined bank and insurance companies have not been selected. Based on these initial selection criteria, Datastream returns 1,718 banks.

Furthermore, the following criteria have been used to select the sample:

- Only those banks for which financial statement data and prices for at least 7 continuous years during the period 1991 – 2002 are available have been selected;
- Banks for which the first two years of earnings estimates are not available are included (these estimates are not required for the model, the first two years of data are solely required to determine B_{t-1} and B_{t-2});

- Banks that have only been listed on a stock exchange after 1991, but prior to 1999, have been included in the sample from the listing date onwards;
- Observations for which no risk-free rate of return, market rate of return, or Beta are available have been omitted.

For a number of banks in the original sample, mainly for banks outside the US, the required data from Datastream (e.g. prices, financial information) are not available or incomplete. As a result, the remaining number of banks in the sample is 194. Data for the first two years are only used to determine the values of B_{t-2} and B_{t-1}, due to which the Residual Income model does not generate any results for these periods. The total number of observations is 1,677.

Due to the fact that the book value and price *per share* are used, any merger or acquisition activity in the period should not have a significant impact either on the value, or on the regression itself. Although this may vary from bank to bank, the total effect is deemed to cancel out over time, and the development of price and calculated value are considered to follow the same pattern. For any banks that have gone through a merger and/or acquisition, no data is available from Datastream for the original underlying entities. Royal Bank of Scotland for example, has taken over National Westminster in 2000. This can be seen from the development of both the price and the value estimation, as reproduced in table 5 below (Total assets in USD '000, both estimated value and year-end price are represented per share):

Item	1998	1999	2000	2001	2002
Total Assets	129,721,344	139,958,240	462,039,296	521,809,920	648,547,584
Estimated Value	4.79	6.50	10.96	17.00	14.79
Year-end Price	15.28	16.04	23.71	24.06	23.47

Table 5: Example – Royal Bank of Scotland

Both price and estimated value develop in the same way, and the data are included in the sample as is, specifically since total assets and capital have developed along similar lines. This may however result in more extreme residual values in the regression model.

All amounts are in USD *per share*, which are automatically provided by Datastream. The exchange rates used are those at the time of the observation, and adjust for EUR where applicable.

The remaining 194 banks are also split into two sub-sets, one estimation sample, and one control sample. The sub-sets are generated randomly, and contain an equal number of observations. Please refer to Appendix B for details of the complete sample.

6.3.1. Sample Details

Although the goodness of fit of the model is determined based on the complete population, the regression is determined based on the elements with the least number of data points. Therefore any banks with less then 5 years of calculated values have been excluded from the sample. Although this only applies to the panel data analysis, and not to the cross-sectional analysis, these

banks have been excluded for both forms of analysis in order to enhance comparability. The distribution of the sample is represented in table 6 below:

Number of years available	Number of banks in sample	% of number of banks	% of total observations
10	118	60.8	70.4
9	7	3.6	3.8
8	15	7.7	7.2
7	13	6.7	5.4
6	18	9.3	6.4
5	23	11.9	6.9

Table 6: Distribution of the Total Population Over Time

Although the sample consists of banks from the US and Western Europe, over 60% of the banks are US based. The geographical distribution is represented in table 7 below:

Country of incorporation	**Number of banks in sample**	**% of number of banks**
Belgium	3	1.5
Denmark	4	2.1
Finland	2	1.0
France	3	1.5
Germany	6	3.1
Greece	1	0.5
Ireland	2	1.0
Italy	10	5.2
Norway	9	4.6
Portugal	2	1.0
Spain	8	4.1
Sweden	2	1.0
Switzerland	9	4.6
The Netherlands	2	1.0
United Kingdom	7	3.6
United States	124	63.9

Table 7: Geographical Distribution of the Sample

The geographical distribution between Western European and American banks is graphically represented in figure 1 below.

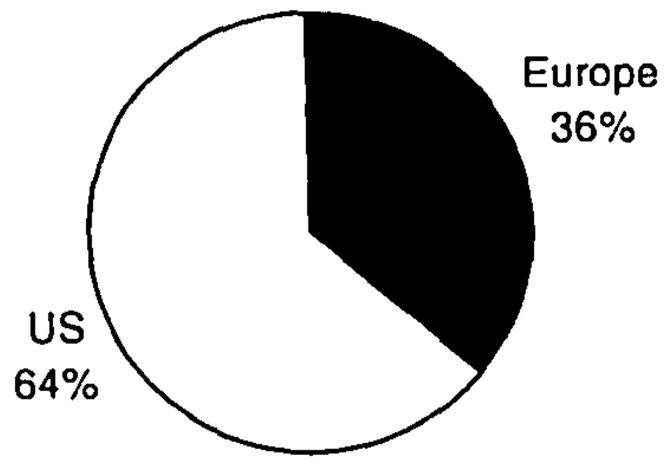

Figure 1: Geographical Distribution of the Sample

The geographical distribution of the sample mimics the geographical distribution of the banks in the original sample which contained all banks listed on the stock exchanges in the US and Europe.

6.3.2. Amendments

Based on the available data and in line with amendments made by Frankel & Lee (1998), the amendments outlined in table 8 have been made:

Amendment	**Number of occurrences**	**% of total observations**
Where earnings (625) are negative, 1% of total assets (392) is used as a proxy.	67	4.0
Where book value per share (1308) is not available, the book value per share is calculated as equity capital and reserves (305) divided by the number of shares (NOSH).	24	1.4
Where the consensus forecast for the long-term growth rate (LTMN) is not available, $FROE_{t+1}$ is used as a proxy for $FROE_{t+2}$.	365	21.8
Observations for which no Market and/or Risk-free rate of return is available have been removed.	21	1.3
Observations for which no Beta is available for individual banks have been removed.	12	0.7

Table 8: Amendments to Conventional Bank Data

Frankel and Lee (1998) use an adjustment for negative earnings of 6%, based on the average earnings over the period of their study. For banks, the average earnings over the period of this study are 1% of total assets, hence an adjustment of 1% of total assets is made in case of negative earnings.

6.3.3. Sample Restrictions

Datastream does not maintain data from banks that are acquired or merged and those that are no longer in business, due to which the sample suffers from survivorship bias.

Due to the variety in balance sheet size and markets in which the banks operate (e.g. national versus internationally active), outliers are more likely to occur in the analysis. This problem is more common in cross-sectional data

than in time series data because cross-sectional data usually deals with members of a population at a given point in time, which may be of a different size (Gujarati (2002:391)). As a result heteroskedasticity occurs in the sample, which is controlled for using the White Heteroskedasticity Consistent Covariance.

The general view amongst practitioners is that in order to apply a time series analysis, the number of observations per individual bank should be at least 30. Owing to the fact that the model used calls for annual data, this implies a requirement for 30 years of data. Besides the fact that it is difficult to obtain 30 years of financial statement data for conventional banks, this would also imply a difference in the period between conventional and Islamic banks, since 30 years of data is not available for Islamic Banks. As a result, the data has been analysed using panel data analysis and cross-sections only. A longitudinal, or panel, data set follows a given sample of individual observations over time and thus provides multiple observations for each of the elements in the sample (Hsiao (2003:3)). The main advantages of this approach are the larger number of data points, the increasing degrees of freedom and reduction in the collinearity among explanatory variables, resulting in improved efficiency of the econometric estimates. Collinearity among explanatory variables does not exist in this research since a simple regression model is used with only one explanatory variable, where the dependent variable is price and the explanatory variable is the calculated value using the Residual Income model (V^e_t).

Inherent to the nature of the Residual Income models is the occurrence of first-degree serial autocorrelation, which results from the fact that the value of a bank (V^c_t) is based on the book value in the previous period. Fairfield (1994) finds that the correlation between the current year ROE and next year's ROE is around 0.66, suggesting that the current period ROE is a reasonable starting point for estimating future ROEs. A similar correlation exists in expected future earnings and Residual Income figures, hence validating the use of an ARMA or ARIMA model to capture the predictive power of the model. Within EViews, controlling for first-degree serial autocorrelation is done by the introduction of an AR(1) term.

6.4. Test Results

Data are analysed using panel data analysis as well as a cross-sectional analysis, with EViews 4.1 as the statistical software. The results of the individual analysis are described in this section.

6.4.1. Panel Data Analysis

The sample is initially analysed by pooling all data in one panel data set. The full sample is then divided in two sub samples, one to estimate the regression, and one control sample. For the control sample, the estimated regression result is used to determine whether the regression can be applied to a different sample and provide similar results. The complete sample is split in two samples of 97 banks each, which are both constructed to contain the same ration of US versus European banks and a similar population size. In order to construct the estimation and control sample, the full sample is stratified by

country and size, after which alternative banks are selected from the sample. As a result, the total number of observations in the estimation sample is 1,486 with 1,480 for the control sample. Two tests are performed; one to establish whether book value captures the cross-sectional differences in stock market value, and one to determine whether the value calculated using a residual Income model provide a more robust measure.

The advantage of using an estimation and a control sample lies in the potential to verify the results of the estimation process on a different subset of data. On the other hand, the advantage of being able to test the model does not always weigh up to the advantages related to the higher explanatory power of the model given a larger sample size. For completeness purposes, the tests are also executed on the full sample. Refer to Appendix C for details of the test results for all different samples as produced by EViews.

The panel data tests for the different tests are executed using the criteria laid out in table 9 and 10 below:

Criteria	**Value**	**Description**
Dependent Variable	P	Market Price.
Independent Variable	B AR(1)	Book value The AR(1) term is included to control for first-degree serial autocorrelation that exists due to the fact that the current book value is also for a significant part the result of the book value in the previous period.
Intercept	Fixed	The basic value (intercept) for each bank depends on organisation specific issues such as balance sheet size. As a result, the intercept is defined as fixed, whereby for each individual pool member the intercept is estimated.
Weighting	Cross-Section Weights	Using cross-section weights, EViews estimates a feasible General Least Squares specification assuming the presence of cross-section heteroskedasticity.
White Heteroskedasticity Covariance	Yes	Controls the output for heteroskedasticity.

Table 9: Analysis Criteria Panel Data – Price/Book value test

Criteria	**Value**	**Description**
Dependent Variable	P	Market Price.
Independent Variable	V AR(1)	Value Calculated using the Residual Income Model defined in equation (9). The AR(1) term is included to control for first-degree serial autocorrelation that exists due to the fact that the calculated value at any time is always based on the book value of the previous period.
Intercept	Fixed	The basic value (intercept) for each bank depends on organisation specific issues such as balance sheet size. As a result, the intercept is defined as fixed, whereby for each individual pool member the intercept is estimated.
Weighting	Cross-Section Weights	Using cross-section weights, EViews estimates a feasible General Least Squares specification assuming the presence of cross-section heteroskedasticity.
White Heteroskedasticity Covariance	Yes	Controls the output for heteroskedasticity.

Table 10: Analysis Criteria Panel Data – Price/Residual Income test

6.4.1.1. Complete Sample

The complete sample is analysed for both the Price/Book value and Price/Residual Income model, in line with the criteria outlined in tables 9 and 10, and in both cases controlled for first-degree serial autocorrelation. The results of these analyses can be found in table 11 below.

Method	**R^2**	**Probability**
Price/Book value	0.887	99.99%
Price/Residual Income	0.806	99.99%

Table 11: Complete sample results

These results for the Price/Residual Income model are in line with the findings of Frankel and Lee (1998), who find that V^e_t explains more than 70% of the cross-sectional variation in stock prices for other industries. Frankel and Lee further find that the Price/Book value ratio is has a similar ability to predict the value of a firm for the short term, but that over the longer run, the Price/Residual Income model performs beter.

Although the results appear to be in the same range for both the Price/Book value and the Price/Residual Income model, these results are misleading as is shown by the results an estimation and a control sample below, these results are misleading, since the Price/Book value results can not be applied to different samples in the same industry to estimate the value.

6.4.1.2. Estimation and Control Sample – Price/Book value test

The sample is analysed using price as the dependent variable, and book value as the explanatory variable, which returns a R^2 (goodness of fit) of 77%, and a Durbin-Watson statistic of 1.08. Although Armstrong (2001) argues that the Durbin-Watson statistic is not applicable to cross-sectional data, as they have no natural order, the Durbin-Watson statistic of 1.08 still indicates a high probability of first-degree serial autocorrelation. The presence of first-degree serial autocorrelation implies that the book value observed at a particular point in time is highly correlated to the value observed at time *t*-1. In order to overcome the serial autocorrelation problem the AR(1) term was introduced as a dependent variable. Once the model is controlled for first-degree serial autocorrelation, the Durbin-Watson statistic is no longer reliable. Any

autocorrelation should then be tested using the Lagrange Multiplier test. This test is however not available for panel data and the Durbin-Watson statistic is used as a proxy.

Based on the criteria listed in table 9, the results of the estimation show a high correlation between the market price and the book value. After controlling for first-degree serial autocorrelation, the R^2 is 91.6%, with a significance level based on the t-statistic of 99.99%. For the Price/Book value comparison the R^2 prior to inclusion of the AR(1) term is lower than the R^2 found after inclusion of the AR(1) term.

In order to determine the predictive value of the results, the control sample is subjected to the Wald-coefficient test. The Wald statistic measures how close the unrestricted estimates of the control sample come to the coefficient found in the estimation sample. For the control sample, the value found for β_2 in equation (14) is substituted for β_2 in the estimation sample, which returns a 41% probability that the slope of the estimation sample can be applied to the control sample. The results of the Wald-coefficient test can be found in table 12.

Wald Test:			
Equation: PBCONTROL			
Test Statistic	Value	df	Probability
F-statistic	0.685046	(1, 1480)	0.4080
Chi-square	0.685046	1	0.4079
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
-0.8684209562000005 + C(1)		-0.053803	0.065005

Table 12: Wald-coefficient Control vs. Estimation Sample – Price/BV

The low probability of the Wald-coefficient (41%) implies that although the result of the regression appeared very significant at a goodness of fit of 91%, the slope of the regression can not be applied to the control sample, indicating that the predictive value is low, and that the goodness of fit of the Price/Book value model for can not be generalised to the combined sample or to the wider population.

6.4.1.3. Estimation and Control Sample – Price/Residual Income Test

For the Price/Residual Income test, the dependent variable is Price, with the explanatory variable being V^e_t, the value calculated using the Residual Income model. The goodness of fit for the estimation sample in this case is, controlled for first-degree serial autocorrelation, 80%, with a confidence level of 98%.

Similar to the Price/Book value test, first-degree serial autocorrelation is present in the sample owing to the fact that the value calculated using the Residual Income model is to a large extent dependent on the previous period book value. When estimating the model without controlling for first-degree serial autocorrelation, the Durbin-Watson statistic is 0.96. The presence of first-degree serial autocorrelation implies that V^e_t observed at a particular point in time is highly correlated to the value observed at time t-1, which is largely due to the fact that the basis for V^e_t is the book value in the previous period. With the introduction of the AR(1) term, the Durbin-Watson statistic is 1.95, implying that the model is free of first-degree serial autocorrelation.

The control sample is subjected to the Wald-coefficient test to determine the predictive value of the model. The value for β_2 in equation (14) is, for the control sample, replaced by β_2 found in the estimation sample, which returns a 78% probability that the slope of the estimation sample can be applied to the control sample. The same Wald-coefficient test applied to the Price/Book value test returned a probability of 41%. The results of the Wald-coefficient test can be found in table 13:

Wald Test:			
Equation: CONTROL			
Test Statistic	Value	df	Probability
F-statistic	0.078364	(1, 1478)	0.7796
Chi-square	0.078364	1	0.7795
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
-0.028653 + C(1)		0.004543	0.016230
Restrictions are linear in coefficients.			

Table 13: Wald-coefficient Control vs. Estimation Sample Price/RI

The probability of 78% implies that the slope of the estimation sample fits the control sample well, which is different from the Price/Book Value test, where the probability given by the Wald-coefficient test is only 41%. As a result, it can be concluded that the relationship between stock market price and V^e_t is more robust than the relationship between stock market price and book value.

Although the Price/Book value tests return a high R^2 for the estimation sample, the low Wald-coefficient test probability implies that the results are unreliable and the model could not be used to estimate the value of a conventional bank. The value calculated using the Residual Income Model (V^e_t) as defined in equation (9), return a somewhat lower R^2, but still implies that more than 80% of the cross-sectional variation in stock prices can be

explained by the calculated value of conventional banks. In combination with the results of the Wald-coefficient test, this leads to the conclusion that the hypothesis that the defined Residual Income model can, to a significant degree, capture cross-sectional differences in stock market returns of conventional banks over a significant period of time (H_1), can be accepted with a 95% confidence level. The summary test results are reproduced in table 14, for detailed test results, refer to appendix C.

Test	R^2	Probability	Wald test
Price/Book value	91.6%	99.9%	40.8%
Price/Residual Income	80.6%	99.9%	78.0%

Table 14: Summary Results

In line with Frankel & Lee (1998) it is found that the result from the Residual Income model is highly correlated to market value and is in itself is sufficient to explain the cross-sectional variations in total market value. The result of the panel data analysis using the value calculated using the Residual Income model is statistically significant enough to reject the H_0 hypothesis of this thesis, which states that for banks there is no relation between accounting value and the stock market measure. This implies acceptance of H_1, which states that the defined Residual Income model can, to a significant degree, capture cross-sectional differences in stock market value of conventional banks over a significant period of time.

6.4.2. Cross Sectional Data Analysis

Analysing the data as cross-sectional only, the results on a year-to-year basis, using the Least Squares method, are as represented in table 15 below:

Year	Observations	R^2
1993	118	0.907382
1994	125	0.983302
1995	140	0.978510
1996	155	0.978361
1997	171	0.953490
1998	194	0.951083
1999	194	0.899158
2000	194	0.887515
2001	194	0.956277
2002	194	0.844327

Table 15: Cross-sectional Analysis Results

Although the values of R^2 differ between the years, these differences are not very significant and can largely be explained by market dynamics and overreaction to market shocks in the years 1999, 2000 and 2002. The results are controlled for heteroskedasticity using the White Consistent Coefficient Covariance. Please refer to Appendix C for details of the test results for all different samples as produced by EViews.

6.4.3. Concluding Remarks on Test Results

The results of both the panel data analysis and the cross-section analysis are statistically significant enough to reject the H_0 hypothesis of this thesis, which states that for banks there is no relation between accounting value and the

stock market measure. This implies acceptance of H_1, which states that the defined Residual Income model can, to a significant degree, capture cross-sectional differences in stock market value of conventional banks over a significant period of time. Resulting from this, it can be stated that the Residual Income model as defined in equation (9) is in itself considered to be useful to determine the value of a conventional bank.

7. *Islamic Bank Data*

As shown by the panel data and cross-sectional analysis, the majority of the cross-sectional variation in stock market prices of conventional banks can be explained by the value calculated using the Residual Income Model specified in equation (9). This implies that it is possible to estimate the market price based on the value calculated using the Residual Income Model. Owing to the fact that all conventional banks that are part of the sample are operating in efficient markets, it is possible to compare the relative value calculated using the Residual Income model with the actual market prices, a situation that does not apply to Islamic banks.

Due to the limited availability or, in some cases complete absence, of data items such as the market and risk-free rates of return, as well as I/B/E/S forecast data for Islamic banks, estimations are required for some of the elements of equation (9). However, the use of appropriately estimated proxy values should in itself not hinder the application of the Residual Income model to Islamic banks.

As argued by Archer and Karim (2001), the lack of transparency in the financial reporting of Islamic banks, in combination with other market imperfections, has created conditions in which, while sharing the same underlying risk as shareholders, investors in Unrestricted PSIA tend to receive a lower rate of return from those assets. Therefore, as also mentioned in chapter 4, the following options are, where possible, tested as part of this research:

1. Exclusion of Unrestricted PSIA from capital

Current Book Value	= Owners' equity
Capital	= Owners' equity
Earnings	= Income attributable to shareholders including Dividend.

2. Inclusion of Unrestricted PSIA in capital

Current Book Value	= Owners' equity + Unrestricted PSIA
Capital	= Owner's equity + Unrestricted PSIA
Earnings	= Income attributable to shareholders including Dividend + Income attributable to Unrestricted PSIA

For confidentiality reasons, the individual banks are coded B01 – B12 throughout this research.

7.1. Summary of Issues

- Islamic banks operate in markets that are, at best, weak-form efficient, which results in the situation that the market rate of return is less reliable. Furthermore, Beta or risk-free rates of return are often not available.
- Not all Islamic banks in the sample are listed on a stock exchange. However, as a result of the random walk theory (Brealey, Myers and Marcus (2003:162-163)) this is not necessarily problematic.
- Capital and earnings are defined in two different ways, where the key issue is the in- or exclusion of Unrestricted PSIA. Both situations are tested.
- The length of the financial year may differ in case the financial year is based on the lunar calendar.

7.2. Data Items

The data elements listed in table 16 have manually been obtained from the financial statements of the Islamic banks in the sample, and have been used to calculate the value of Islamic banks. Contrary to conventional banks, for which *per share* data is available from Datastream, for Islamic banks dividends, book value, and other data, are incorporated as a total amount.

Data Item	**Description**
Dividend	Dividends paid to shareholders.
Equity Capital and Reserves	Equity Capital and Reserves represents the Book value in a given year. Excludes proposed dividends.
Earned for ordinary	Net income after deduction of the income attributable to unrestricted investment before depreciation and taxes.
Unrestricted Investment Accounts	Balances of unrestricted investment account holders. As defined in chapter 4, both inclusion and exclusion of this item in Equity Capital and Reserves will be tested.
Earned for unrestricted	Income attributable to unrestricted investment accounts. As defined in chapter 4, both inclusion and exclusion of this item in net earnings will be tested.
Total Assets	Total assets as reported on the balance sheet.

Table 16: Financial Statement Data Items Islamic Banks

The fact that Islamic banks operate in markets that are, at best, weak-form efficient and for which market rates of return, Beta, or risk-free rates of return are often not available, is implicit in their qualification as Emerging Markets. As stated by Bruner, Conroy, Li, O'Halloran and Lleras (2003:6), emerging markets form the tier just below the developed economies, and markets are considered to be emerging if they meet the following two criteria:

- It is a low-, lower-middle, or upper-middle-income economy as defined by the World Bank; and
- Its market capitalisation after removing holdings not available for foreign investors is low relative to its most recent GDP figures.

With the exception of the United Arab Emirates (UAE), the countries in which the Islamic banks that are part of this research are incorporated are qualified as emerging markets (World Bank/IFC – Emerging Markets Database (EMDB)). The UAE is classified as a high-income country and does therefore not meet the first criterion for emerging markets. However, given the relative (im)maturity of their capital markets, the UAE is also treated as an emerging market for the purpose of this research. For emerging markets the risk-free rates of return, Beta and market rates of return are not always available and may need to be estimated.

7.2.1. Estimation of the Risk-free Rate of Return

As mentioned earlier, Tomkins and Karim (1987) argue that the Capital Market Line could be used as a measure of the cost of capital for Islamic banks, but that the risk-free rate should be set to 0 instead of the market rate. For this research however, the risk-free rate of return remains as part of CAPM due to the fact that Islamic banks currently operate in the same markets as conventional banks. Therefore, an investor would measure the expected return on investment against the risk-free rate of return also used to evaluate other investment opportunities. Furthermore, the nominal risk-free rate of return used in this research contains an element of inflation adjustment, which should be taken into consideration for Islamic banks as well. In this research,

similar to the determination of the required rate of return for conventional banks, the nominal risk-free rate of return is used for Islamic banks.

Risk-free rates of return for the countries in which Islamic banks are incorporated are often not available or only for the most recent years. The economies in which most Islamic banks are based are closely linked to the US economy due to their reliance on oil revenues, and due to the fact that their exchange rates are in most cases pegged to the US dollar. As a result, in accordance with the International Fisher Effect (Brealey, Meyers and Marcus (2003:623)) the nominal US risk-free rate, adjusted for the inflation differential, is used as a proxy for the risk-free rate of return for the various countries. Although the economies of Bangladesh and Jordan are different from the economies of the other countries that are part of this research, the International Fisher Effect can still be applied using the US risk-free rate in combination with the inflation rates to estimate the risk-free rate for these countries for this research.

All inflation rates have been obtained from the IMF World Economic Outlook, and represent the average annual inflation rates. The US risk-free rate of return, inflation rates and resulting risk-free rates for the countries part of this research are represented in table 17.

Country	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	Base Nominal Risk-free Rate of Return											
United States	5.26	3.15	3.04	4.69	5.6	5.18	5.24	5.04	4.8	6.26	3.42	1.62
	WEO Inflation Rate											
Bahrain	0.9	-0.3	2.6	0.4	3.1	-0.1	4.6	-0.4	-1.3	-0.7	-1.2	-1.0
Bangladesh	8.3	3.6	3.0	6.1	10.8	2.5	5.0	8.6	9.0	3.4	1.6	2.4
Jordan	8.2	4.0	3.3	3.6	2.3	6.5	3.0	3.1	0.6	0.7	1.8	1.8
Malaysia	4.4	4.7	3.6	4.1	3.5	3.5	2.6	5.1	2.8	1.6	1.4	1.8
Saudi Arabia	4.6	-0.4	0.8	0.6	5.0	0.9	-0.4	-0.2	-1.3	-0.6	-0.8	-0.4
United Arab Emirates	5.5	4.3	5.2	5.7	4.4	3.0	2.9	2.0	2.1	1.4	2.2	2.8
United States	4.2	3.0	3.0	2.6	2.8	2.9	2.3	1.5	2.2	3.4	2.8	1.6
	Inflation Rate Differential											
Bahrain	-3.17	-3.20	-0.39	-2.14	0.29	-2.92	2.25	-1.87	-3.42	-3.97	-3.89	-2.56
Bangladesh	3.93	0.58	0.00	3.41	7.78	-0.39	2.64	7.00	6.65	0.00	-1.17	0.79
Jordan	3.84	0.97	0.29	0.97	-0.49	3.50	0.68	1.58	-1.57	-2.61	-0.97	0.20
Malaysia	0.19	1.65	0.58	1.46	0.68	0.58	0.29	3.55	0.59	-1.74	-1.36	0.20
Saudi Arabia	0.38	-3.30	-2.14	-1.95	2.14	-1.94	-2.64	-1.67	-3.42	-3.87	-3.50	-1.97
United Arab Emirates	1.25	1.26	2.14	3.02	1.56	0.10	0.59	0.49	-0.10	-1.93	-0.58	1.18
United States	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Estimated Nominal Risk-free Rate of Return											
Bahrain	1.92	-0.15	2.64	2.45	5.91	2.11	7.61	3.08	1.22	2.04	-0.60	-0.98
Bangladesh	9.40	3.75	3.04	8.26	13.82	4.77	8.02	12.39	11.77	6.26	2.21	2.42
Jordan	9.30	4.15	3.34	5.71	5.08	8.86	5.96	6.70	3.15	3.49	2.42	1.82
Malaysia	5.46	4.85	3.64	6.22	6.32	5.79	5.55	8.77	5.42	4.41	2.01	1.82
Saudi Arabia	5.66	-0.25	0.84	2.65	7.86	3.14	2.46	3.29	1.22	2.15	-0.20	-0.38
United Arab Emirates	6.58	4.45	5.24	7.85	7.25	5.28	5.86	5.55	4.70	4.21	2.82	2.82
United States	5.26	3.15	3.04	4.69	5.60	5.18	5.24	5.04	4.80	6.26	3.42	1.62

Table 17: Risk-free Rate Proxy

As a result of the significant negative inflation differential, the nominal risk-free rate for Bahrain and Saudi Arabia is negative in the years 1992, 2001, and 2002. Owing to the fact that the nominal risk-free rate cannot normally be negative, the nominal risk-free rate of return has in these instances been set to 0 for the calculations.

7.2.2. Estimation of the Market Rate of Return

The majority of empirical research in the emerging markets area (e.g. Conover, Jensen and Johnson (2002), and Bruner, Conroy, Li, O'Halloran and Lleras (2003)) uses EMDB data as a proxy for the market rate of return. This data is available from Datastream as 'MSCI Worldscope' and has, where available been used.

For Bahrain and Saudi Arabia, the monthly closing prices of the Market Index are available from the stock exchange (Bahrain Stock Exchange (1998 and 2004) and the central bank (Saudi Arabian Monetary Agency (2004)) respectively. For Bahrain, the closing price of the Market Index is only available until the end of 2001. The year-end closing price for 2002 has been estimated based on the MSCI World Index for Bahrain. The MSCI World Index for Bahrain started in 1998 and although using a different base year, shows the exact same trend for 1998 – 2001 as the index provided by Bahrain Stock Exchange. The trend in MSCI World Index has been used to estimate the year-end closing prices for the Bahrain Stock Exchange Market Index for 2002.

Table 18 represents the data sources used to estimate the market rates of return

Country	**Market Rate of Return**
Bahrain	Bahrain Stock Exchange Monthly Closing of the Index in combination with estimations for 2002 based on the trend in MSCI World Index
Bangladesh	Estimated based on the risk premium for Malaysia.
Jordan	MSCI World Index
Malaysia	MSCI World Index
Saudi Arabia	Saudi Arabian Monetary Agency Share Price Index
United Arab Emirates	Estimated based on the risk premium for Saudi Arabia.

Table 18: Market Rate of Return Data Sources

For both the United Arab Emirates and Bangladesh, the MSCI World Index is not available at all. Owing to the fact that similar to Saudi Arabia, the economy of the United Arab Emirates is largely oil based it can be argued that the market rate of return for the period 1993 – 2002 for Saudi Arabia can be used as a proxy for the United Arab Emirates. The Bangladesh economy is regionally most closely linked to Malaysia, and, although the economies of Malaysia and Bangladesh differ in other ways, the Malaysian market rate of return is used as a proxy for Bangladesh for the purpose of this research. The estimated market rates of return are represented in table 19.

Country	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Bahrain	0.28	-0.21	-0.13	0.17	0.49	-0.05	0.01	-0.18	-0.02	0.01
Bangladesh	0.37	0.45	0.10	0.06	-0.06	-0.55	0.84	0.03	-0.30	0.28
Jordan	0.20	-0.09	0.06	-0.11	-0.02	-0.14	0.02	-0.25	0.29	0.03
Malaysia	0.38	0.43	0.03	0.07	-0.08	-0.59	0.77	0.02	-0.31	0.27
Saudi Arabia	-0.05	-0.28	0.07	0.12	0.29	-0.28	0.44	0.11	0.08	0.04
United Arab Emirates	-0.01	-0.23	0.06	0.14	0.32	-0.26	0.47	0.13	0.10	0.06

Table 19: Market Rates of Return

7.2.3. Estimation of Beta

For none of the Islamic banks is estimated or actual β available from any data source, as a result of which a proxy is required. In general, banks can be seen as fairly risk averse, as a result of which it can be argued that their β would expected to be close to 1, the overall market β. It can further be argued that banks are highly leveraged, as a result of which a higher β might be expected. Faff, Brooks and Kee (2002) find that for banks β is actually lower than would be expected based on the levels of financial leverage. As Copeland, Koller and Murrin (2000) argue, the majority of banks' debt consists of customer account balances which are related to liability management and the subsequent potential to create value, resulting in a situation that these funds are part of the operational activities of the bank and should not be considered as purely financing. In line with this argument, it can be argued that the leverage levels of banks are not significantly high. Furthermore, Bolt and Tieman (2002 and 2004) find that the actual level of capital held is often higher than the

minimum prescribed by the regulators, which results in lower risk levels, and hence explains a lower β.

The average β of all the conventional banks that are part of this research is 0.8, but fluctuates on a year-to-year basis, as can be seen in table 20. The fluctuations are based on the perceived changes in risk profiles and the risk levels in comparison with the overall market[1]. Table 20 and figure 2 reflect the average annual fluctuations in β for all conventional banks in the sample.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Average Beta	0.843	0.896	0.887	0.730	0.788	0.859	0.943	0.879	0.757	0.699

Table 20: Average Annual β Conventional Banks

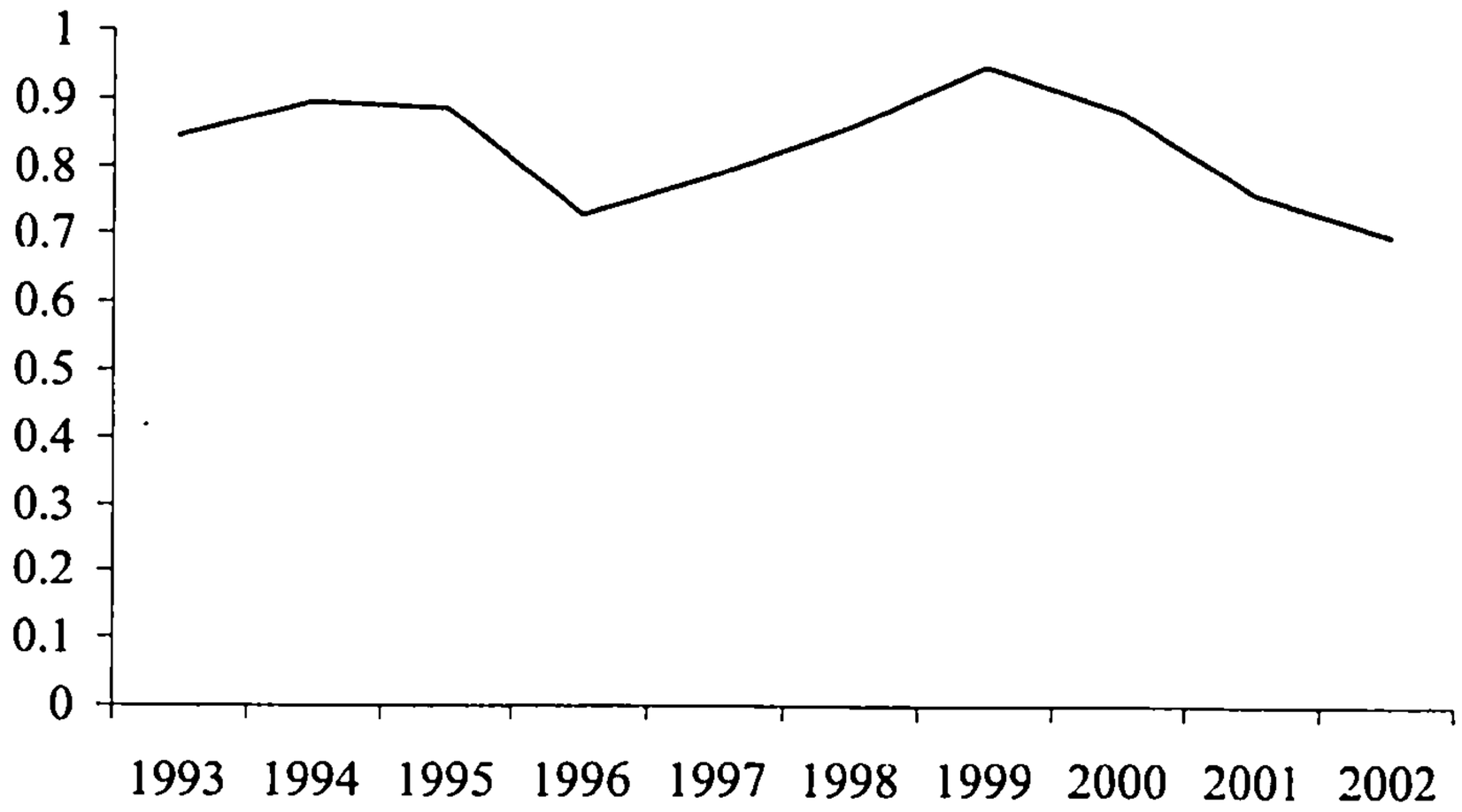

Figure 2: Average Annual β Conventional Banks

[1] Andrew Lo; Interview with CFA Magazine Issue November/December 2003

Further analysis of the average β leads to the conclusion that in the earlier years of the sample (1993 – 1996) β is significantly more normally distributed than in the later years. This can be concluded from the probability values related to the Jarque-Bera test value, where a higher probability indicates a higher probability of a normal distribution (table 21).

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Mean	0.84285	0.8963	0.88707	0.73026	0.78789	0.85868	0.94292	0.87874	0.75691	0.69928
Median	0.82375	0.88167	0.85792	0.7125	0.79333	0.85917	0.97224	0.86167	0.72333	0.65083
Maximum	2.10667	1.97333	2.13833	1.9475	2.0075	2.21167	2.4575	2.41833	2.26	2.14667
Minimum	-0.675	-0.2442	-0.31	-0.3625	-0.5518	-0.0483	-0.0617	-0.1842	0.00167	-0.1333
Std. Dev.	0.47057	0.44991	0.46932	0.43686	0.3806	0.37166	0.41895	0.42371	0.4168	0.43139
Skewness	-0.044	0.26248	0.30387	0.26826	0.21866	0.41153	0.35495	0.40298	0.74359	0.78612
Kurtosis	3.04644	2.66742	2.90117	2.92954	3.99017	3.72702	3.78584	3.79216	4.04046	3.65651
Jarque-Bera	0.05521	2.31713	2.4011	1.93986	8.15296	9.44684	8.97203	10.323	26.6285	23.4656
Probability	0.97277	0.31394	0.30103	0.37911	0.01697	0.00889	0.01127	0.00573	0.000002	0.000008

Table 21: Average Annual β Conventional Banks – Descriptive Statistics

The Jarque-Bera indicator implies that the distribution can be considered normal in the periods 1993 – 1996, but is more skewed during the later periods, mainly as a result of a larger number of positive outliers in these years. This is also clearly visible from the Kernel Distribution Density graphs in figure 3, which provide an overview of the dispersion of the results.

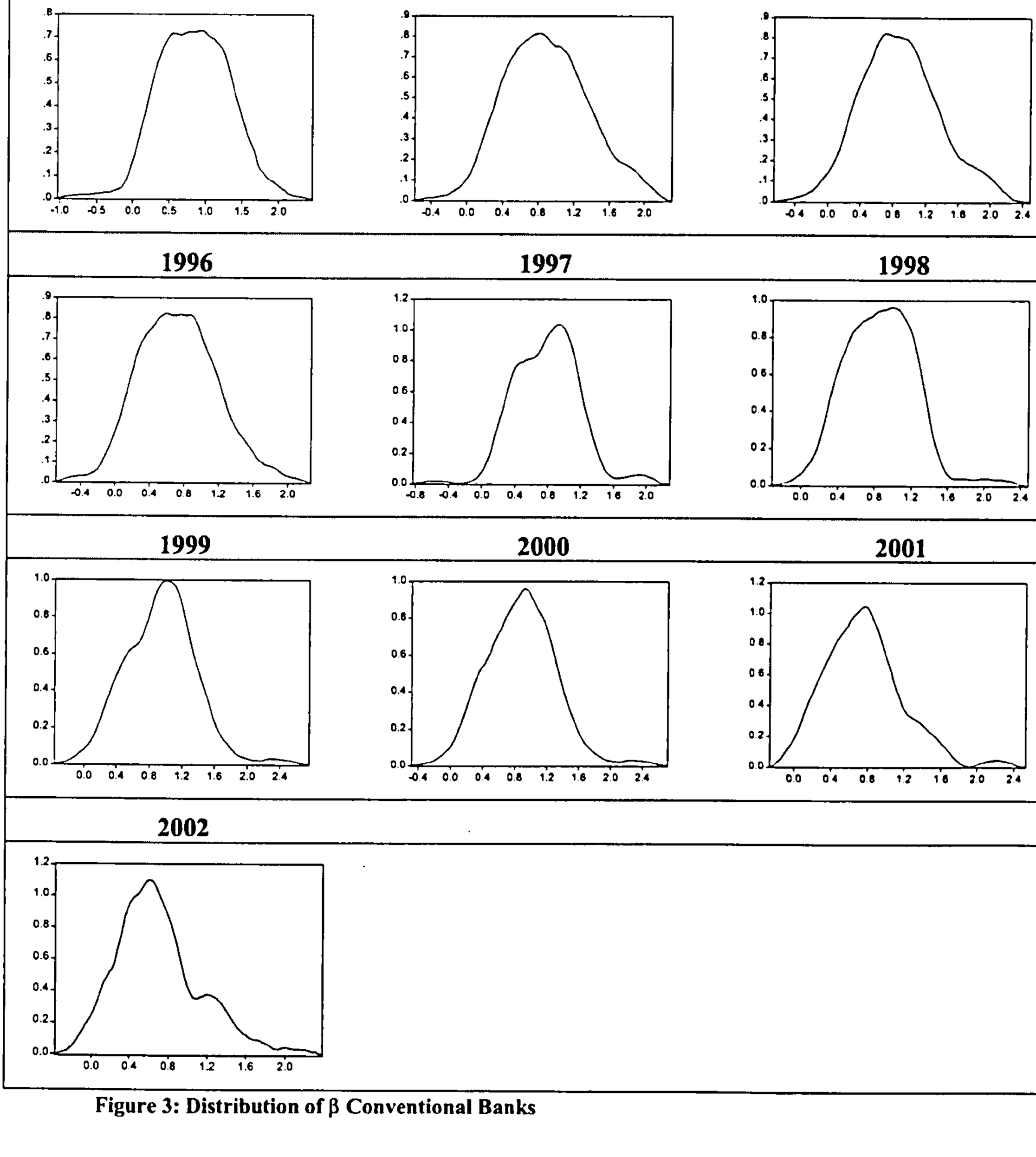

Figure 3: Distribution of β Conventional Banks

McKenzie, Brookes, Faff and Ho (2000) have researched the extreme outliers of β values for banks. In a sample of 18 US banks, they find 8 banks with extreme outliers in estimated β. For a significant part (six out of eight banks),

they find that these outliers in β are explained by the arrival of company specific news to the market. Although for this research the average annual β is used, significant company news still has a large impact on the underlying daily β, and hence the average annual β. In the sample used for this research however, for the majority of the outliers, a trend towards a higher β can be observed over the years, which tends to become more pronounced over the period, and is also noticeable in the monthly β's. Berkowitz (1998) argues that the estimation of a firm's systematic risk is becoming increasingly difficult due to increased competition, mergers and acquisitions, and reorganisations. Although the β's used in this research are actual observed values, these issues still apply, and will have an impact on the fact that the distribution of the β's shifts to steeper peaks and additional skewness.

As mentioned in chapter 4, in comparison with conventional banks, Islamic banks encounter different types of risk such as fiduciary risk and displaced commercial risk (Archer and Karim (2001)), but may also face additional credit, market, and liquidity risks related to the fact that fewer risk-hedging instruments and techniques are available, underdeveloped or non-existent inter-bank and money markets and government securities, and limited availability of a lender of last resort (Sundararajan and Errico (2002)). On the other hand, as Sundararajan and Errico (2002) state, Islamic banks have historically been forced to hold a comparatively larger proportion of their assets in reserve accounts with central banks or in correspondent accounts, which offsets the higher risk for investors. Nienhaus (2001) points out that Islamic banks employ a large proportion of their funds in *Murabaha*

transactions, which are relatively safe, and hence have a low risk attached to them. Standard & Poor's (2002) applies the same ratings approach to Islamic and conventional banks, and argues that the positive factors that Islamic banking brings in terms of profitability, cheap and stable deposits, and customer loyalty, tend to be offset by weaker liquidity, greater risk concentration, and more heterogeneous as well as less rigorous regulatory, accounting, and disclosure frameworks.

The general expectation is that even though Islamic banks encounter different types of risk, the risk levels of Islamic banks are no higher than risk levels of conventional banks, so that the average annual β of the conventional bank sample can be used as a proxy for β of Islamic banks. Owing to the similar expected risk levels, this will provide a reasonable estimate. However, as a result of the fact that the distribution of β is more skewed in the later years of the research period, and the standard deviation is quite high (table 21), it has been considered appropriate to use the median values as a proxy for β for Islamic banks rather than the mean. The percentage difference between the median and the mean values of β is represented in table 22:

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Mean Beta	0.843	0.896	0.887	0.730	0.788	0.859	0.943	0.879	0.757	0.699
Median Beta	0.824	0.882	0.858	0.713	0.793	0.859	0.972	0.862	0.723	0.651
% Difference (Median – Mean)	-2%	-2%	-3%	-2%	1%	0%	3%	-2%	-4%	-7%

Table 22: Percentage Difference Mean and Median β

The difference in value between the mean and median values of β does not appear to be large. The significance is however depending on the sensitivity of the model to changes in the value of β. The sensitivity of the model to changes in the value of β is tested by applying a positive and negative change to the mean value of 1%. The results show that the model is equally sensitive to a positive as to a negative change. In general, it can be concluded that although the model shows sensitivity to changes in β, the changes in V^e_t are significantly smaller than the changes in β. Table 23 shows that the average change in value for a 1% increase in β is significantly lower than 1%.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B01						0.15%	0.00%	0.43%	0.04%	-0.01%
B02							0.06%	0.56%	-0.14%	0.02%
B03	-0.34%	0.52%	0.37%	-0.19%	-0.47%	0.15%	0.00%	0.43%	0.04%	-0.01%
B04	-0.32%	0.37%	0.20%	0.01%	-0.28%	0.67%	-0.55%	-0.16%	-0.05%	-0.05%
B05	-0.34%	0.52%	0.37%	-0.19%	-0.47%	0.15%	0.00%	0.43%	0.04%	-0.01%
B06	-0.43%	-0.47%	0.06%	-0.01%	0.23%	2.35%	-0.78%	0.05%	0.64%	-0.29%
B07						0.15%	0.00%	0.43%	0.04%	-0.01%
B08								0.43%	0.04%	-0.01%
B09	-0.44%	-0.44%	0.19%	-0.03%	0.27%	2.45%	-0.71%	0.08%	0.64%	-0.29%
B10	-0.24%	0.29%	-0.02%	0.31%	0.12%	0.40%	0.03%	0.63%	-0.33%	
B11					-0.47%	0.15%	0.00%	0.43%	0.04%	-0.01%
B12							0.00%	0.43%	0.04%	-0.01%
AVG	-0.35%	0.13%	0.19%	-0.02%	-0.15%	0.73%	-0.18%	0.35%	0.09%	-0.06%

Table 23: Sensitivity of the Model to Changes in the Value of β

Two issues require further clarification. The sign of the change in value can be either positive or negative, which is depending on the market risk premium, in combination with the movement in earnings in the same period. For B06 and B09, the changes in value for a 1% change in β in 1998 are 2.35% and 2.45% respectively, which is due to the fact that the market risk premium for these banks moves in the opposite direction compared to the growth in earnings. For

both banks, the earnings growth is positive in 1998, in combination with a negative market risk premium, which is caused by the fact that for those years the estimated risk-free rate exceeds the market rate of return, which is caused by significant reductions in market prices. Theoretically, a negative market risk premium should not occur, due to the fact that the risk-free rate is not expected to be lower than the ex ante market rate of return. The reason for the market-risk premium to be negative could be related to the fact that a proxy is used for the risk-free rate of return. The implication of this is that the International Fisher Effect might not hold in combination with extreme swings in the market-rate of return that can be observed for these countries. This, however, is deemed to be an area out of the scope of this research. From the last series in the table, the average impact of a 1% change in β on the value, it can be concluded that the model is sensitive to changes in β, but not to a great extent.

In any case, using either the mean or the median of β for each of the Islamic banks as a proxy overlooks the specific individual risk profiles of the banks, and is therefore not the most accurate. However, this is an area for future research. For the purpose of this study, the mean value of β of conventional banks has been used as a proxy.

7.2.3. Estimation of Growth

For Islamic banks consensus forecasts for growth are not available, and it is not feasible to use dividend growth as a proxy for sustainable growth since

Islamic banks often do not appear to follow a dividend growth policy. For the purpose of this research, growth for Islamic banks will be measured based on the actual growth during the period. For the year 2002, the 1-year forecasted growth cannot be determined based on actual data, since actual data for the year 2003 is not available. Similarly, the 2-year forecasted growth cannot be determined for 2001 and 2002. For these periods, the growth will need to be estimated based on historically available data.

From the analysis of the data, it appears that for the payout to investment account holders a growth policy is often maintained, which, in general is sustained out of the profit equalisation reserve. Although AAOIFI has introduced an accounting standard related to transparency in relation to profit smoothing (AAOIFI (2002)) in 2000, it is too early to be able to conclude whether or not profit smoothing no longer takes place. Growth will be determined based on the growth in total distributable cash flows, which consists of total profits for unrestricted account holders and shareholders. For the purpose of this research, actual growth will be used where possible, in combination with estimated growth forecasts based on the observed trend. The growth rates per bank are represented in table 24. The estimated values are shaded light grey, all other values are based on actual growth rates.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	1-year forecast											
B01								0.09	0.08	-0.24	-0.49	-0.65
B02									2.31	0.15	-0.26	-1.84
B03	0.49	0.27	0.74	0.27	0.05	0.20	0.09	-0.18	0.49	0.46	0.03	0.09
B04	-0.12	0.28	0.09	0.30	0.09	0.08	0.07	0.05	0.29	-0.22	-0.09	-0.02
B05	-0.11	0.05	0.31	0.15	0.04	0.06	-0.05	0.03	0.02	-0.20	-0.36	-0.19
B06	0.09	0.24	0.24	0.30	0.13	0.22	0.31	-0.05	0.18	0.16	0.14	0.13
B07								0.48	0.17	0.51	0.08	0.10
B08										0.39	0.34	0.29
B09	-0.13	0.23	0.44	0.36	0.10	0.08	0.18	0.23	0.41	0.25	0.55	0.42
B10	0.19	0.13	0.24	-0.01	0.05	-0.01	0.07	-0.08	0.02	-0.01	0.02	-0.07
B11						0.95	-0.09	-2.45	0.27	-0.02	-0.17	-0.52
B12								0.11	-0.76	-0.93	25.54	25.01
	2-year forecast											
B01							0.09	0.08	-0.24	-0.49	-0.65	-0.86
B02								2.31	0.15	-0.26	-1.84	-3.13
B03	0.27	0.74	0.27	0.05	0.20	0.09	-0.18	0.49	0.46	0.03	0.09	0.08
B04	0.28	0.09	0.30	0.09	0.08	0.07	0.05	0.29	-0.22	-0.09	-0.02	-0.10
B05	0.05	0.31	0.15	0.04	0.06	-0.05	0.03	0.02	-0.20	-0.36	-0.19	-0.29
B06	0.36	0.54	0.62	0.47	0.38	0.60	0.25	0.12	0.36	0.31	0.13	0.18
B07							0.48	0.17	0.51	0.08	0.10	0.02
B08									0.39	0.34	0.29	0.23
B09	0.23	0.44	0.36	0.10	0.08	0.18	0.23	0.41	0.25	0.55	0.42	0.40
B10	0.13	0.24	-0.01	0.05	-0.01	0.07	-0.08	0.02	-0.01	0.02	-0.07	-0.08
B11					0.95	-0.09	-2.45	0.27	-0.02	-0.17	-0.52	-0.60
B12							0.11	-0.76	-0.93	25.54	25.01	32.62

Table 24: Growth Estimations

The growth forecast for the periods 2001 and 2002 is determined by applying a linear trend analysis to the actual growth rates in the previous years. More sophisticated measures such as ARMA can be applied to part of the sample, but not to all banks due to the limited availability of historical data. Bank B12 has reported a loss in the year 2002. In line with the amendments specified in paragraph 7.3.2, 2% of total assets is used as a proxy for earnings. Owing to the fact that this results in significant earnings growth between 2001 and 2002, the 1-year and 2-year forecast for the years 2000 - 2002 is unrealistically high.

Because of the application of a trend analysis, the future expectations continue to be unrealistically high. In order to circumvent this issue, the earnings growth rate is estimated to be 2% for 2002, resulting in the growth estimation represented in table 25:

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1-year								-0.25	0.03	0.06	0.10	0.26
2-year							-0.25	0.03	0.06	0.10	0.26	0.36

Table 25: Adjusted Growth Estimations B12

Besides the one and two-year forecasted growth, the long term forecasted growth is also not available from any data source. In line with Frankel and Lee (1998), the two-year forecasted growth rate will be used as a proxy for the long-term growth rate.

7.3. Sample

The number of Islamic banks that are currently active and the number of years they have been in existence is significantly lower than the number and average lifespan of conventional banks. As a result, the sample of Islamic banks that can be used for this research is small. All Islamic banks in the sample are members of AAOIFI, which, due to the application of the same set of accounting regulations, enhances the standardisation of the financial statement data, even though for the majority of the banks in the sample the application of AAOIFI standards is on a voluntary basis. For the banks in the sample, during the period covered in this research, the AAOIFI standards were only enforced in Bahrain. In all other countries, the application of AAOIFI standards was voluntary during the period of this study, although recently Jordan, Sudan, and

Qatar also enforce them. This situation has a negative impact on the standardisation of the financial statements, and hence the comparability of the banks in the sample. Issues that arise are, for instance, the different accounting treatment of Unrestricted PSIA. Some banks treat unrestricted PSIA as off-balance sheet items, whereas others treat them as on-balance sheet. In some cases, the distinction between Restricted and Unrestricted PSIA is not made at all in the financial statements. The disclosure levels between banks also differ, not only when it comes to the distinction between Restricted and Unrestricted PSIA, but also in relation to the payout to Unrestricted PSIA, and profit equalisation practices.

The data has been manually collected from financial statements for the period 1991 – 2002 or any part since inception, and have been requested directly from the banks themselves.

From the 23 banks originally identified that have been invited to provide their financial statements, 1 had only started operations in 2002 and hence did not have any financial statements available. For 13 of the remaining 22 banks, financial statements have been obtained, one of which is a multilateral organisation, and has been excluded from the tests. The resulting sample consists of 12 Islamic banks in different locations. For the banks that started their operations during the period 1991 – 2002, the initial equity capital is reported in the first annual report, even though no other data is available. As a result, the book value of equity can be determined prior to the start of

operations. Owing to the already restricted sample size, no further criteria have been applied, and the total number of observations is 78.

7.3.1. Sample Details

The Islamic banks that are part of this sample are geographical distributed as represented in table 26.

Country of Origin	**Number of Banks**	**Years**
Bahrain	2	1991 – 2002
	2	1996 – 2002
	1	1997 – 2002
	1	1998 – 2002
	1	1999 – 2002
Bangladesh	1	1991 – 2002
Jordan	1	1991 – 2001
Malaysia	1	1991 – 2002
Saudi Arabia	1	1991 – 2002
United Arab Emirates	1	1999 – 2002

Table 26: Islamic Bank Sample

On request of some of the banks, for confidentiality purposes, the names of individual Islamic banks are not disclosed throughout this study.

7.3.2. Amendments

Based on the available data the following amendments have been made:

- In one year, for two of the banks in the sample, 'earned for ordinary' is negative, in one case due to a significant amount allocated to provisions, in the other case as a result of impairment of fair value. For conventional banks, in line with Frankel and Lee (1998), 6% of total assets is used as a proxy for earnings. For Islamic banks, the proxy is based on the average of 'earned for ordinary' as a percentage of total assets over the years, which is 2%.

- One of the banks was initially working in accordance with the lunar calendar, but has changed to the solar calendar after the end of the financial year 1419 (corresponding with 16th April 1999). As a result, the financial year ending 31 December 2000 consists of 19.5 months. In order to enhance comparison with the other banks in the sample all years have been re-estimated at 31 December using linear interpolation.

7.3.3. Sample Restrictions

As mentioned earlier, significant changes have taken place in the accounting policies of Islamic banks. Although these do not directly have an impact on the overall reported results, the Unrestricted PSIA and profits paid out to them are not always reported and for some years have been estimated based on the notes to the financial statements.

For four of the banks in the sample, the amount of Unrestricted PSIA and the profits paid out to them are not available. These banks have been excluded from the test where the value is calculated based on the combination of the return to Unrestricted PSIA and the return on equity capital.

For one of the banks in the sample, savings accounts are included in the Unrestricted PSIA, but not included as a separate item in the notes prior to 1996. Savings accounts are in this case assumed to be part of Unrestricted PSIA for the complete period

For one of the banks in the sample, some of the items reported as deposits prior to 1999 could potentially be Restricted PSIA (i.e. Mudaraba – Hajj). Owing to the fact that these amounts represent only a small portion of the total deposit amount they have been included as Unrestricted PSIA.

8. *Application of the Model – Islamic Banks*

Few of the Islamic banks are listed on a stock exchange, and even for those that are listed, the prices are not considered to provide an accurate representation of the value, and the market is highly illiquid. As a result, it is not possible to apply the regression results for conventional banks to Islamic banks and determine whether the Residual Income model can, to a significant degree, capture cross-sectional differences in stock market value over a significant period of time. However, even though both capital and asset structures of Islamic banks differ from those of conventional banks, it should be possible to use the same Residual Income model as defined for conventional banks to determine the value of Islamic banks, as long as the parameters of the model are estimated correctly given the specifics of Islamic banks. This implies that the Residual Income model provides a reliable proxy of the value of Islamic banks. Two situations are further analysed, where the difference is related to the treatment of Unrestricted PSIA. In the first sample, the Unrestricted PSIA are not included as capital, but are treated similar to deposits in a conventional bank, being a source of operational funds. In the second sample, the Unrestricted PSIA are treated as part of the capital of the bank.

8.1 *Unrestricted PSIA Not Included in Capital*

All twelve banks that are part of this research are included in this sample. The Residual Income model is applied as follows:

- Earnings include only earnings attributable to shareholders;
- Capital consists only of equity capital;

- The 1 and 2 year forecasts are based on the growth in earnings attributable to shareholders, with the exception of the 1-year growth forecast in 2002 and the 1 and 2-year growth forecast in 2001, which are estimated, based on the growth rate in Unrestricted PSIA.

The results of the calculations are represented in table 27, with all amounts in USD '000.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
E_B01						52,542	51,852	79,957	61,238	49,681
E_B02							346,899	942,540	1,411,908	1,947,323
E_B03	35,295	81,528	69,078	44,693	29,172	66,171	58,036	83,514	62,366	57,524
E_B04	1,098,678	1,973,649	1,036,252	1,051,630	898,910	2,501,886	757,581	1,414,242	1,593,664	1,725,291
E_B05	23,035	54,386	46,041	29,803	19,621	43,260	49,030	104,913	100,002	94,498
E_B06	29,506	28,892	57,536	59,695	82,722	956,298	84,522	248,167	438,518	189,728
E_B07						112,216	117,718	181,850	150,742	161,271
E_B08								96,811	80,662	86,807
E_B09	4,198	5,693	13,633	19,933	24,479	82,383	8,216	41,710	86,284	66,958
E_B10	40,373	65,248	52,742	69,619	64,876	90,697	71,676	124,181	495,324	
E_B11					3,728	6,267	7,899	15,553	14,402	16,079
E_B12							32,466	48,372	30,247	26,423

Table 27: Calculated Values – Excluding Unrestricted PSIA

Due to the fact that each of the banks has a different capital base, these numbers cannot be compared directly, but a comparison of value creation can be seen in figure 4.

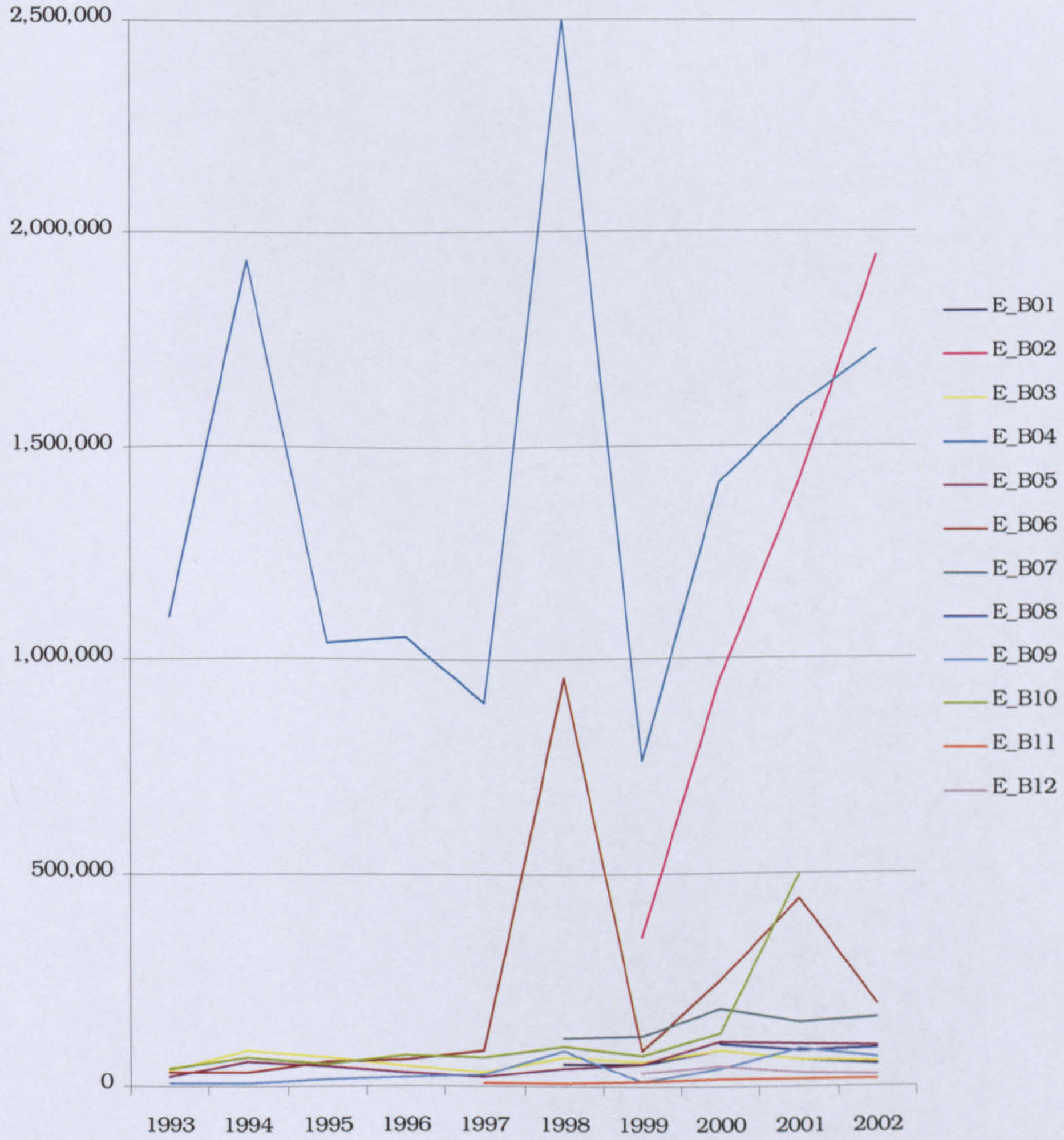

Figure 4: Comparative Value Creation – Excluding Unrestricted PSIA

From figure 4, it can be seen that certain trends are quite pronounced, such as the increases in 1998 and 2001, although there is a distinct difference between individual banks in the sample and their value creation ability. The peaks are mainly caused by negative market returns in those years, the resulting low r_e value. As a result, the Residual Income component is discounted by a very low value.

8.2. Unrestricted PSIA Included in Capital

From the twelve banks in the total sample, four do not report the amount of, and profit paid out to, Unrestricted PSIA holders as separate items on their balance sheet and statement of income. These banks have been removed for this part of the analysis. The Residual Income model is applied as follows:

- Earnings include earnings attributable to shareholders and the profit share paid out to Unrestricted PSIA holders;
- Capital consists only of equity capital and the amount of Unrestricted PSIA;
- The 1 and 2 year forecasts are based on the growth in earnings attributable to shareholders and the profit share paid out to Unrestricted PSIA, with the exception of the 1 year growth forecast in 2002 and the 1 and 2 year growth forecast in 2002 which are estimated based on the growth rate in Unrestricted PSIA.

The results of the calculations are represented in table 28, with all amounts in USD '000.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
I_B01						181,436	225,077	270,945	190,940	248,715
I_B02							506,879	1,465,798	2,270,681	2,948,873
I_B03	83,383	205,142	169,498	102,213	75,056	170,269	132,403	219,479	224,638	253,450
I_B05	198,032	494,157	423,588	275,959	187,669	409,170	382,244	600,883	474,411	481,648
I_B06	120,715	202,850	501,826	488,541	685,198	2,580,854	369,443	1,621,218	3,320,222	1,668,568
I_B07						119,918	123,396	246,871	189,990	236,715
I_B09	70,008	75,607	152,142	196,135	278,123	1,071,200	120,452	471,282	1,097,959	644,355
I_B10	283,831	501,387	423,654	539,727	490,190	631,892	498,043	830,707	808,164	

Table 28: Calculated Values – Including Unrestricted PSIA

As with the exclusion of Unrestricted PSIA, each of the banks has a different capital base, and these numbers cannot be compared directly, but a comparison of value creation can be seen in figure 5.

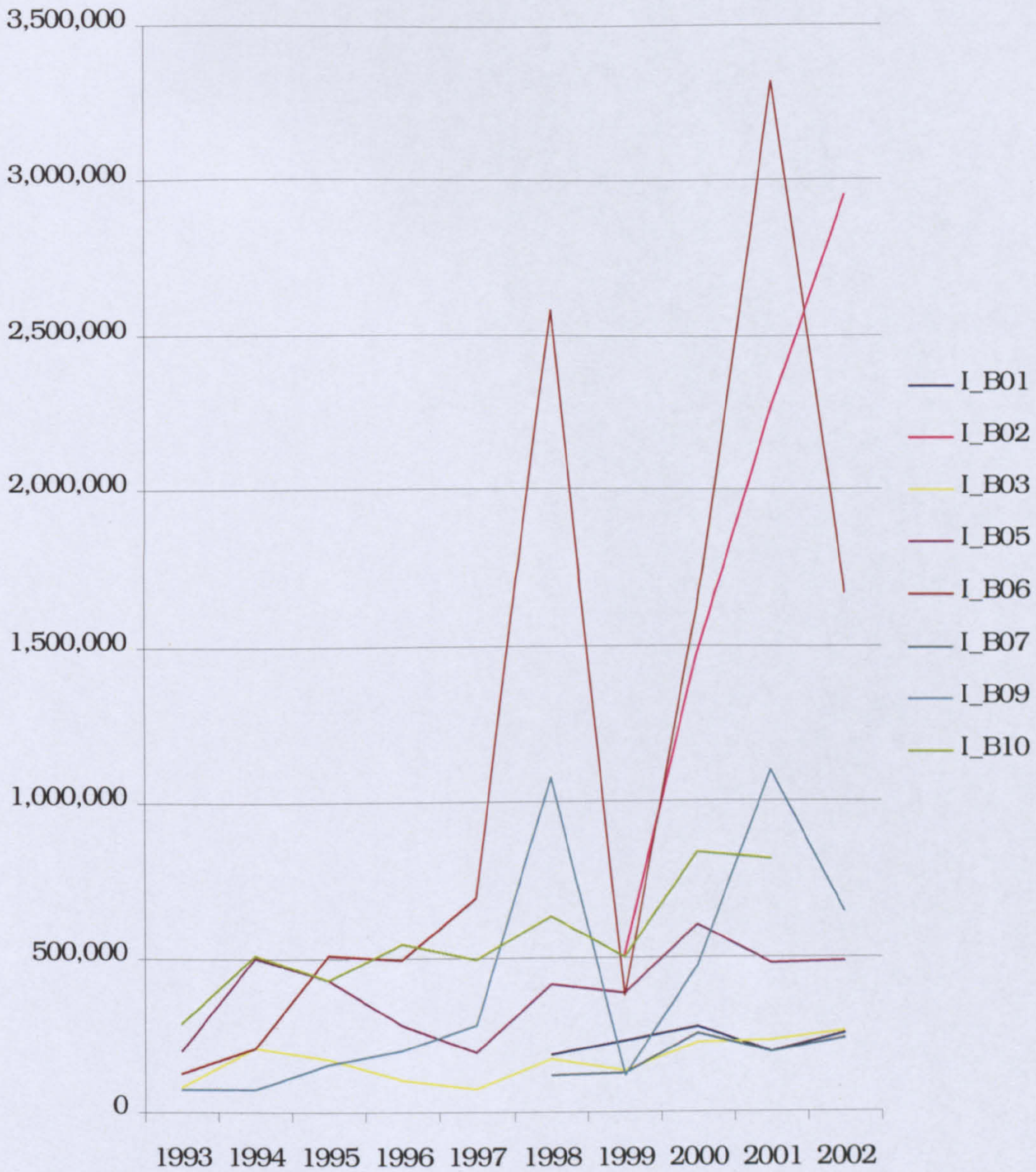

Figure 5: Comparative Value Creation – Including Unrestricted PSIA

From figure 5, it can be seen that in comparison with the situation where Unrestricted PSIA are excluded from the equation, the value created is more pronounced, but the general trend remains fairly similar.

Furthermore, it is possible to determine the implied value of Unrestricted PSIA, by deducting the values Included and Excluded Unrestricted PSIA.

Table 29 provides an overview of the implied value of Unrestricted PSIA.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	Unrestricted PSIA - Reported Balances									
B01						118,611	176,960	135,073	124,929	201,071
B02							334,624	659,615	1,012,453	1,111,591
B03	73,714	81,570	80,320	73,083	90,520	95,794	75,970	96,159	156,301	197,931
B05	268,247	290,194	301,979	312,758	331,525	336,721	340,399	350,768	360,631	391,110
B06	159,699	336,361	473,917	486,071	540,986	414,814	854,000	1,424,627	1,724,643	2,107,054
B07						7,088	5,800	45,985	37,804	76,216
B09	114,189	139,180	169,981	195,905	239,785	289,956	361,539	462,048	608,605	824,495
B10	335,483	372,725	416,982	416,699	423,657	428,469	441,842	438,195	468,616	
	Unrestricted PSIA - Implied Values									
B01						128,893	173,225	190,988	129,702	199,034
B02							159,998	523,258	858,773	1,001,551
B03	48,088	123,614	100,420	57,520	45,884	104,098	74,367	135,965	162,272	195,926
B05	174,997	439,771	377,547	246,156	168,048	365,910	333,213	495,970	374,409	387,150
B06	91,209	173,958	444,291	428,846	602,476	1,624,556	284,921	1,373,051	2,881,703	1,478,840
B07						7,703	5,678	65,021	39,248	75,444
B09	65,811	69,914	138,508	176,202	253,644	988,817	112,237	429,572	1,011,675	577,397
B10	243,458	436,139	370,912	470,108	425,314	541,195	426,367	706,526	312,840	

Table 29: Implied Value – Unrestricted PSIA

Table 29 shows that the implied value of Unrestricted PSIA does not always approximate the reported balances. For a large part this is due to the fact that the value of PSIA is affected by deposits and withdrawals over the period, which are not visible from the data in the financial statements. Owing to this it is not possible to determine the increase in value solely attributable to Unrestricted PSIA. Further analysis of the data shows that where implied

values are lower than the reported value, this can mainly be contributed to the fact that in those instances the required return on equity as calculated using CAPM, exceeded the expected future return on equity.

This situation is similar to the differences between the book value and calculated value of equity only. For comparison reasons, only those banks for which Unrestricted PSIA are identified separately are included in table 30, which represents the book value of equity and the implied, or calculated value of equity.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	Book value of equity									
B01						48,351	52,971	56,549	58,986	50,191
B02							725,510	1,188,158	1,664,574	2,161,282
B03	54,100	53,798	55,252	56,785	57,550	60,893	59,288	59,063	60,071	58,113
B05	35,310	35,887	36,826	37,867	38,708	39,809	50,087	74,197	96,323	95,465
B06	51,662	55,864	61,372	67,660	74,279	244,180	253,339	257,488	262,444	270,325
B07						103,263	120,256	128,610	145,195	162,921
B09	7,280	11,332	16,732	22,163	23,141	24,156	26,464	44,859	51,903	96,362
B10	55,632	55,761	59,293	61,709	64,623	71,806	74,277	77,018	741,965	
	Implied value of equity									
B01						52,542	51,852	79,957	61,238	49,681
B02							703,142	1,784,399	1,359,372	2,076,127
B03	35,295	81,528	69,078	44,693	29,172	66,171	58,036	83,514	62,366	57,524
B05	23,035	54,386	46,041	29,803	19,621	43,260	49,030	104,913	100,002	94,498
B06	29,506	28,892	57,536	59,695	82,722	956,298	84,522	248,167	438,518	189,728
B07						112,216	117,718	181,850	150,742	161,271
B09	4,165	5,843	15,431	19,654	25,489	92,727	8,793	43,050	86,622	67,429
B10	40,373	65,248	52,742	69,619	64,876	90,697	71,676	124,181	495,324	

Table 30: Implied Value – Equity

The differences between reported and calculated values are to the exact same magnitude as for Unrestricted PSIA, and are, in case the calculated value is lower than the reported book value, mainly due to the fact that the actual – or, for the last two years, estimated – growth rate is lower than the required return on equity determined using CAPM.

The fact that in a substantial number of instances the calculated values are below the reported book values could potentially be related to the suitability of the risk-free rate proxy and/or the forecasted growth rates. On the other hand, in the event the accounting earnings are below the cost of capital, the value calculated using the Residual Income model (V^e_t) will be below the current book value.

8.3. Comparison of Exclusion and Inclusion of Unrestricted PSIA

Although the value of an individual Islamic bank differs based on whether Unrestricted PSIA is excluded or included, the general trend remains the same. This can be observed clearly in figure 6, where for each of the banks that are part of both sample sets the value is calculated using the Residual Income model both excluding Unrestricted PSIA and including Unrestricted PSIA. The resulting value is then scaled by the capital to obtain the percentage return.

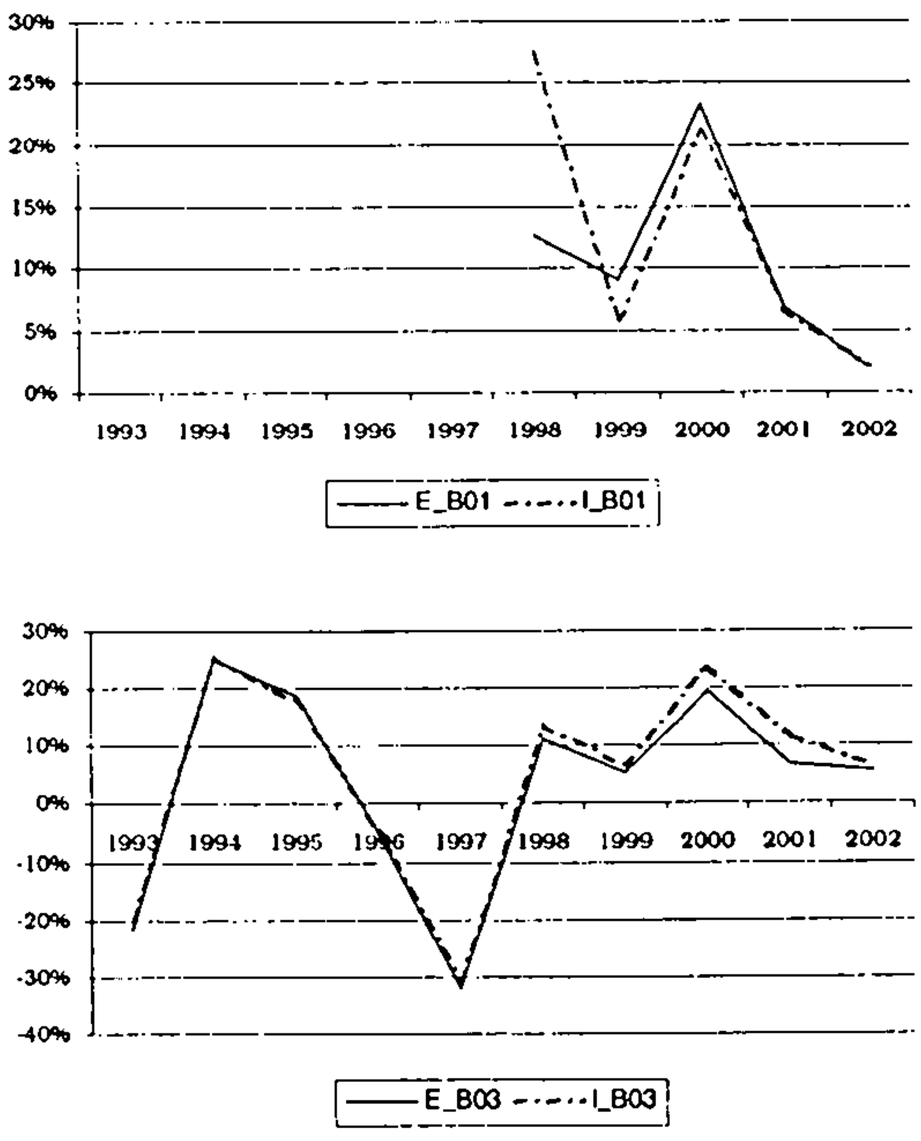

Figure 6: Comparative Value Creation – Exclude vs. Include Unrestricted PSIA

Figure 6 displays for each of the individual Islamic banks for which Unrestricted PSIA data is available the value of the Islamic bank scaled for capital Excluding Unrestricted PSIA (E_B**) and Including Unrestricted

PSIA (I_B**). As can be observed from the individual banks' results, the value created as a percentage of capital when including Unrestricted PSIA is in general lower, but follows roughly the same trend as the value created as a percentage of capital excluding Unrestricted PSIA, the difference being explained by the *Mudarib* share. Due to the absence of information on withdrawals from and deposits to Unrestricted PSIA, the results including Unrestricted PSIA can not be interpreted easily. Table 31 provides for each of the banks individually as well as an average of the percentage profit for each of the types of profit and capital combinations being:

- Return on Equity – Net profit attributable to shareholders as a percentage of equity capital;
- Return on Unrestricted PSIA – Profit attributable to Unrestricted PSIA holders as a percentage of the total amount of Unrestricted PSIA; and
- Return on Total Capital – Profit attributable to shareholders + profit attributable to Unrestricted PSIA as a percentage of total capital (equity + amount of Unrestricted PSIA).

For B06 and B09, extreme values are observed for 1998, which are due to the fact that for these banks the market risk premium displayed a large negative movement but the results of the banks were positive compared to the previous period.

From table 31, it can be observed that the returns to Unrestricted PSIA holders are often, but not always, less volatile than the earnings attributable to shareholders, a situation that also shows in the average returns.

		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B01	Return on Equity						8%	9%	7%	5%	3%
B01	Return on Unrestricted PSIA						6%	4%	6%	5%	2%
B01	Return on Total Capital						6%	5%	6%	5%	2%
B02	Return on Equity							1%	1%	1%	1%
B02	Return on Unrestricted PSIA							3%	4%	3%	1%
B02	Return on Total Capital							1%	2%	2%	1%
B03	Return on Equity	2%	6%	8%	7%	8%	7%	7%	3%	5%	6%
B03	Return on Unrestricted PSIA	5%	6%	7%	9%	9%	10%	11%	8%	8%	6%
B03	Return on Total Capital	4%	6%	8%	8%	9%	9%	9%	7%	7%	6%
B05	Return on Equity	10%	10%	11%	11%	10%	10%	8%	6%	6%	5%
B05	Return on Unrestricted PSIA	3%	4%	5%	5%	5%	4%	5%	4%	3%	1%
B05	Return on Total Capital	4%	5%	5%	5%	5%	5%	5%	5%	3%	2%
B06	Return on Equity	26%	24%	36%	38%	38%	15%	16%	16%	19%	22%
B06	Return on Unrestricted PSIA	10%	7%	6%	6%	7%	12%	5%	4%	4%	3%
B06	Return on Total Capital	14%	10%	9%	10%	11%	13%	8%	6%	6%	5%
B07	Return on Equity						13%	17%	18%	24%	23%
B07	Return on Unrestricted PSIA						5%	6%	2%	5%	1%
B07	Return on Total Capital						13%	16%	14%	20%	16%
B09	Return on Equity	21%	35%	33%	23%	14%	12%	13%	10%	15%	29%
B09	Return on Unrestricted PSIA	5%	5%	5%	6%	6%	6%	6%	7%	6%	5%
B09	Return on Total Capital	6%	7%	8%	7%	7%	7%	7%	7%	7%	8%
B10	Return on Equity	10%	12%	13%	15%	15%	16%	15%	15%	2%	
B10	Return on Unrestricted PSIA	6%	7%	6%	5%	5%	5%	4%	4%	4%	
B10	Return on Total Capital	7%	8%	7%	7%	6%	7%	6%	6%	3%	
AVG	Return on Equity	14%	18%	20%	19%	17%	12%	11%	10%	10%	13%
AVG	Return on Unrestricted PSIA	6%	6%	6%	6%	6%	7%	5%	5%	5%	3%
AVG	Return on Total Capital	7%	7%	7%	8%	8%	8%	7%	7%	7%	6%

Table 31: Return on Capital

In a number of cases, and certainly on average, the returns on Unrestricted PSIA appear to closely follow the interest rates that can be observed in the market. In this respect it can be argued that even though Unrestricted PSIA display characteristics of equity, the funds obtained should be considered as

operational funds, similar to other funds obtained. However, the changes in accounting regulation that have come into effect at the start of the financial year 2000, may have an impact on this situation, which is exhibited by the fact that in the years 2000 – 2002, the returns to Unrestricted PSIA more closely follow the overall returns of the bank.

8.4. Concluding Remarks Islamic Bank Analysis

It becomes clear from the analysis of Islamic bank data that the value of an Islamic bank displays more volatility when Unrestricted PSIA are included in capital. However, this appears to be caused by the increases and decreases in the funds available for investment.

During the earlier part of the research period, the returns to Unrestricted PSIA holders appear to closely follow the interest rates that can be observed in the market. From 2000 onwards however, the return to Unrestricted PSIA appear to more closely match the overall returns of the bank. Although it is too early to conclude that Islamic banks are treating Unrestricted PSIA more like equity when determining the payout, there potentially is a trend in that direction. As a result, it can be argued that although historically the inclusion of Unrestricted PSIA in capital may lead to distortion of the results, this might no longer be the case going forward. Future research will have to be carried out in order to support this argument.

Given the limitations of the sample, it is at this point in time fairly impossible to draw definitive conclusions considering the possibility of applying a

sophisticated valuation model such as Residual Income to an emerging industry. The issues that are found in this respect can be summarised as follows:

- Limited sample size. The number of Islamic banks that are in existence is limited, and even though 50% of the banks approached have responded positively to inclusion in this research, the sample contains only 12 banks. Furthermore, only few banks have been in operation for more than 4 years.
- The implementation of AAOIFI accounting standards varies per country. In Bahrain, the standards are mandatory since 1998. Sudan, Jordan and Qatar have recently started to make the application of AAOIFI standards mandatory. For banks in other countries the implementation of AAOIFI accounting standards is wholly voluntarily. This severely restricts the transparency of the financial statements during the period of this study, and hinders the comparability across Islamic banks.
- Unrestricted PSIA are in some cases treated as on-balance sheet instruments, and in others as off-balance sheet instruments, a situation that again hinders the comparability between banks. Where possible, amendments to the data have been made to include unrestricted PSIA on the basis of the notes the accounts. However, the information is not in all cases available.
- Disclosure levels differ between banks, resulting in missing information that is vital for an appropriate determination of value. For instance, profit smoothing practices, the lack of information regarding the amounts of Unrestricted PSIA and the profits paid out to them, as well as the often

summary information in the notes to the accounts are all related to the low disclosure levels.

- Risk-free and market rates of return as well as company β data are generally not available and proxies need to be determined.
- Analyst consensus growth estimations are not available, and estimates for the 1-year, 2-year, and long-term growth forecast have to be made based on historical growth data.

The low reliability and comparability of the financial statement data, in combination with the extensive use of proxy information, and the limited sample size result in the situation that the suitability of the Residual Income model to determine the value of Islamic banks can not be demonstrated in the same way as for conventional banks, and it is therefore almost impossible to draw definitive conclusions. Furthermore, the market is relatively immature, which further reduces the potential ability to apply a Residual Income model. However, the findings are indicative of the possibility of applying the Residual Income model to compare the value of Islamic banks, and the potential to apply the model as such that comparisons can be made with conventional banks once the issues found will be resolved.

8.5. Comparison with Conventional Banks

Based on an external validation with the market price, it appears that the Residual Income model performs well for conventional banks. Due to the absence of market data it is however not possible to validate the results for Islamic banks in the same way. Conventional and Islamic banks operate in the

same industry, and even though their balance sheet structures differ, they are not substantially different. In order to provide an indication of the possibility to apply the Residual Income model to Islamic bank, the trend of value created per year of conventional banks, scaled by the book value is used as a benchmark.

The value created in a certain period of time consists of earnings (including dividend) over and above the cost of capital employed, which is the Residual Income component of the Residual Income model as defined in equation (9) and is represented in equation (15):

$$RI_t = (\text{Earnings}_t - (r_e * B^c_{t-1})) \qquad (15)$$

The value thus calculated takes the perceived risk into consideration in the required return on equity (r_e), and is hence in part dependent on the development of the market rate of return versus the risk-free rate of return. The average value created by conventional banks over the period of this study calculated using equation (15) is represented in figure 7 below.

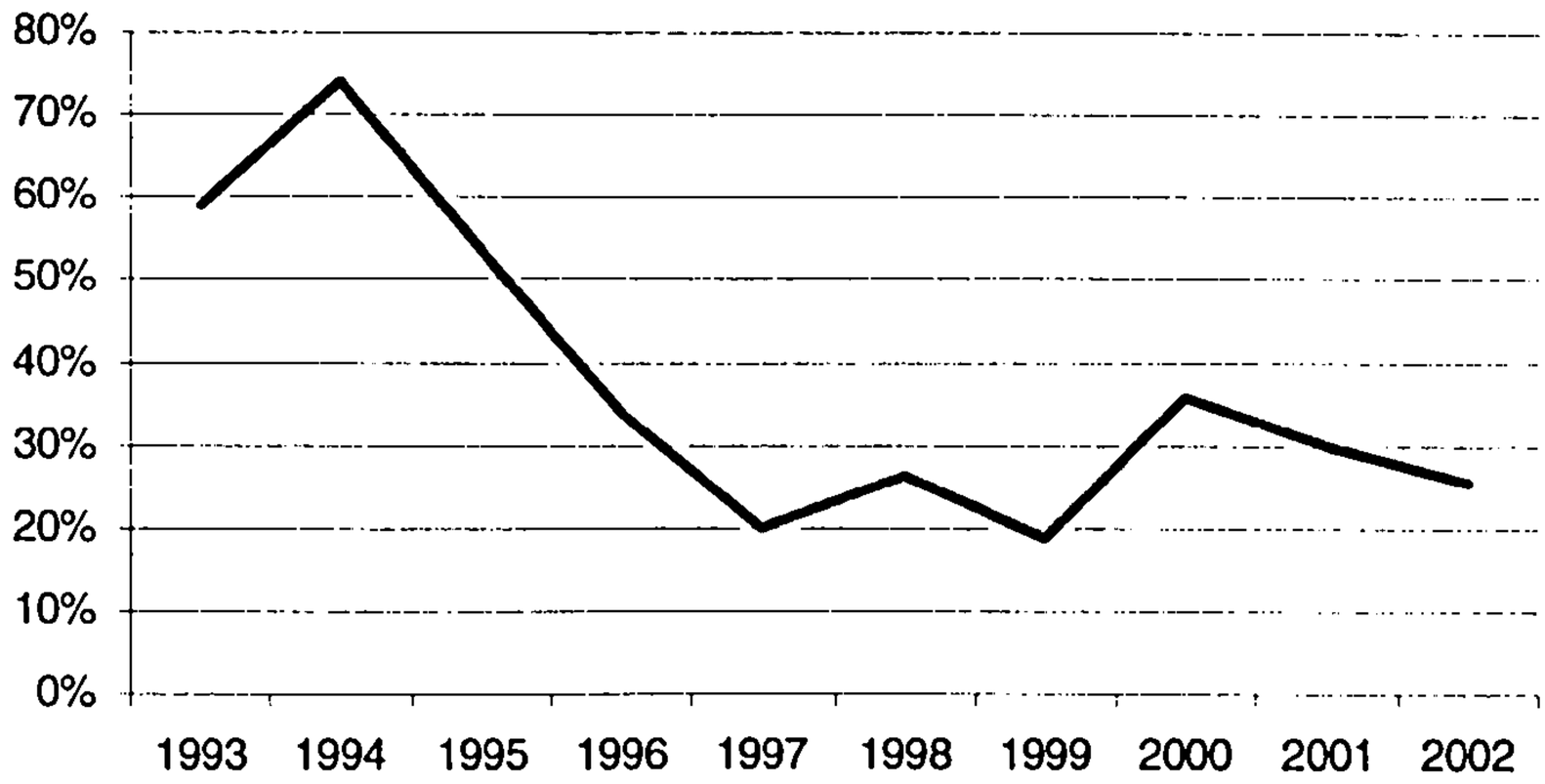

Figure 7: Average Annual Value Creation Conventional Banks

Due to the fact that Islamic and conventional banks operate in the same industry, the annual value created is calculated in the same way using the Residual Income component specified in equation (15). As a result, it would be expected that the average annual value created of Islamic banks followed the same trend as that of conventional banks graphed in Figure 7.

From the analysis of Islamic banks in the previous sections, it turns out that the inclusion of Unrestricted PSIA in capital potentially provides a more realistic indication of the value of an Islamic bank than when Unrestricted PSIA are excluded from capital. This is mainly due to the fact that, as mentioned earlier, Unrestricted PSIA displays characteristics of equity. The AAOIFI accounting regulation that has come in to effect in 2000 also treats Unrestricted PSIA in line with equity where payout to accountholders is concerned.

In order to determine the value creation in a particular period for Islamic bank, and hence enable comparison of Islamic banks with conventional banks, the Residual Income component as defined in equation (15) is also determined for Islamic banks. Since it can be argued that inclusion of Unrestricted PSIA provides a better indicator than the exclusion of Unrestricted PSIA from capital, only those banks for which the amounts and payout to Unrestricted PSIA are available are included in this part of the analysis. The results of the calculations are reproduced in table 32.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
I_B01						27%	6%	21%	7%	2%
I_B02							-40%	-8%	-6%	-4%
I_B03	-20%	25%	18%	-5%	-31%	14%	7%	23%	11%	7%
I_B05	-20%	24%	16%	-7%	-35%	9%	4%	21%	6%	2%
I_B06	-17%	-21%	9%	4%	17%	64%	-60%	7%	29%	-13%
I_B07						18%	17%	35%	23%	21%
I_B09	-24%	-32%	-1%	3%	11%	54%	-71%	6%	31%	-9%
I_B10	-9%	16%	1%	13%	7%	18%	4%	27%	-16%	
AVG	-18%	2%	9%	2%	-6%	29%	-17%	17%	11%	1%
Weighted AVG	-16%	0%	8%	4%	4%	39%	-25%	17%	11%	-5%

Table 32: Residual Income

In order to enable comparison with the banking industry as a whole, the resulting value created based on the Residual Income calculation for conventional banks and Islamic banks are graphed in figure 8.

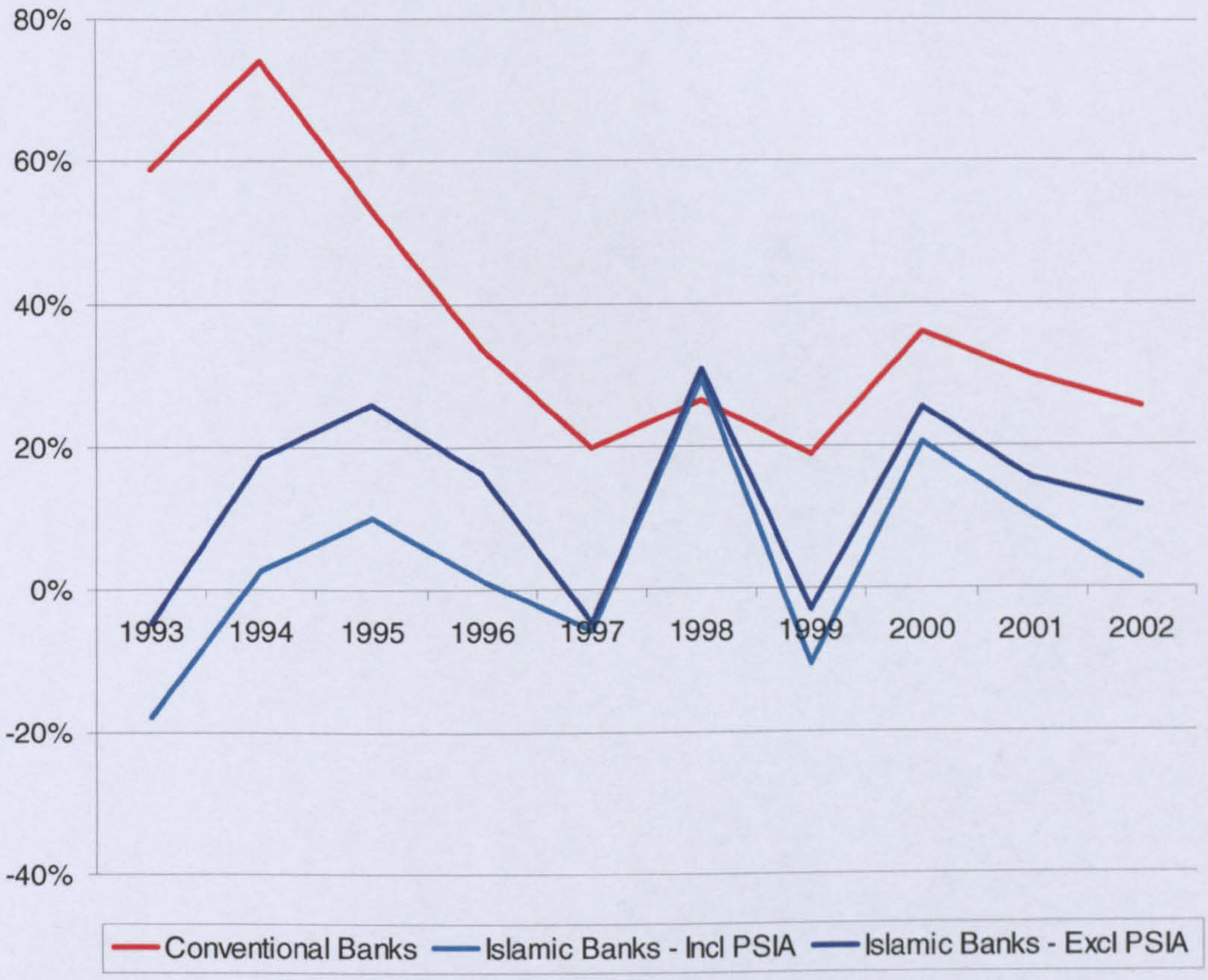

Figure 8: Average Annual Value Creation Islamic banks versus Conventional banks

As can be observed from figure 8, the Residual Income of Islamic banks, especially in later years, follows a pattern similar to that of conventional banks, but displays higher volatility. Conventional banks show an extremely high Residual Income in 1994 due to the high interest rates in this year, and the high spread between interest income and interest payment. The gap between conventional and Islamic banks becomes smaller in later years, in part due to the fact that more Islamic banks are included in the sample from 1998 onwards. The difference between including or excluding or Unrestricted PSIA varies, but becomes smaller in later years. The differences between conventional and Islamic banks can partly be clarified by the fact that Islamic

banks form a relative young market, and operate in weak-form efficient markets for which market data is often not available, and has to be estimated using proxies. However, the trend is similar to that for conventional banks.

Owing to the fact that the values calculated for Islamic banks are subject to the use of proxies, in combination with the small size of the Islamic bank sample, generalisations cannot easily be made on the basis of the test results. Based on these results, the expectation is that it might be possible to use the Residual Income model as specified in equation (9) to estimate the value of an Islamic bank and then to estimate the value created using equation (15), but further research with a larger sample size and actual data rather than proxies will be required to validate this.

As a result, it can be concluded that even though the capital and asset structures of Islamic banks are different from conventional banks, it might be possible to compare the value created of both types of banks as long as specific characteristics are taken into account. However, validation of the model results against market values is not possible for Islamic banks. Furthermore, the issues identified are of such a nature that it is not possible to draw any firm conclusions in relation to the probability of successfully applying a Residual Income valuation model to Islamic banks. The issues identified have a significant impact on the results and therefore, it can only be stated that initially it appears to be possible to apply the Residual Income identified to determine the value of both conventional banks and Islamic

banks. Future research will need to be undertaken once theses issues are less pronounced or completely addressed in order to validate this.

9. Summary and Conclusion

This chapter contains the summary of findings and conclusions for conventional and Islamic banks, the research contribution, and topics for further research.

9.1. Summary Findings and Conclusions for Conventional Banks

The Residual Income model that is used in this research has shown to be a viable valuation approach for non-banks using stock-market valuations as a benchmark in numerous other studies. However, this has not before been shown for the conventional banking sector.

When the value of a conventional bank is determined using the Residual Income model as defined in equation (9), the value explains a large percentage of cross-sectional variations in market prices. The analysis is done constructing two samples, one to estimate the regression, and one control sample. Both samples contain an equal number of banks with the same ratio of US versus European banks and a similar population size. The results show a high correlation between the market price and the value estimated using the Residual Income model, controlled for first-degree serial autocorrelation and heteroskedasticity. The R^2 for the estimation sample is 80%, with a confidence level of 99%. The control sample is then subjected to the Wald-coefficient test, which measures how close the unrestricted estimates of the control sample come to the coefficient found in the estimation sample. For the control sample, β_2 in equation (14) found for the estimation sample β_2, which returns a 78% probability that the slope of the estimation sample can be applied to the

control sample. The probability of 78% implies that the slope of the estimation sample fits the control sample well, which is different from the Price/Book Value test, where, although the R^2 is high with a high confidence level, the probability given by the Wald-coefficient test is only 41%. As a result, it can be concluded that the relationship between stock market price and V^e_t is more robust than the relationship between stock market price and book value.

The results from the various analysis imply that more than 80% of the cross-sectional variation in stock prices can be explained by the value calculated using the Residual Income Model (V^e_t) as defined in equation (9), which is in line with the findings of Frankel and Lee (1998) for non-financial industries. As a result, it can be argued that the model provides a robust indication of the value of a conventional bank, given its perceived risk as compared to the market portfolio.

Based on the results of this study it can be concluded that the Residual Income model can be applied to banks, and it is established that there is a relationship between the accounting measure and the stock market measure. A significant percentage of the cross-sectional variations in stock market prices of conventional banks can be explained by the value of the firm calculated by the model.

9.2. Summary Findings and Conclusion for Islamic Banks

Historically Islamic and conventional finance are based on the same core principle, which is to provide financial intermediation between holders of

surplus funds and those requiring funds for investments. Apart from the fact that Islamic finance operates based on the principles of the *Qur'an,* which prohibits both interest and speculation, the main difference between the Islamic and conventional banking industry is related to the further development of the industries. Where the first conventional banks started in the 18th century, Islamic banks only started operating in their current form in 1975. As a result of the fact that the Islamic banking industry is still relatively young, a number of issues related to availability and transparency of data still occur. Moreover, Islamic banks predominantly operate in countries where the capital market is not fully developed, so that share prices for such banks are either not determined in an efficient market setting or not available at all.

The results of this research indicate that it is in principle possible to apply the Residual Income model to Islamic banks, although a number of issues surrounding the non-availability of market data and restricted sample size, and the resultant need to use proxies, and the lack of transparency of accounting information will need to be resolved before more definite conclusions can be drawn regarding its application in practice. Support for the validation of the results can be found in the comparison of the average value created by Islamic banks and conventional banks, which shows a similar trend, although especially in earlier years the results for Islamic banks are more volatile than the ones for conventional banks.

In summary, the following issues have been identified which hinder the validation and generalisation of the results for Islamic banks:

- Limited sample size, both in number of banks and in number of years available for historical data;
- The implementation of AAOIFI accounting standards, which varies per country;
- Unrestricted PSIA are in some cases treated as on-balance sheet instruments, and in others as off-balance sheet instruments. Investments and withdrawals of funds can not be determined separately from changes in value, and in some cases information related to Unrestricted PSIA is not available at all;
- Differences in disclosure levels differ between banks;
- Risk-free and market rates of return as well as company β data are generally not available and proxies need to be determined;
- Analyst consensus growth estimations are not available, and estimates for the 1-year, 2-year, and long-term growth forecasts have to be made based on historical growth data.

The short time series and inadequate market data for estimation of the cost of capital cause difficulties in the accurate application of the Residual Income model to Islamic Banks. However, as can be seen in table 23, the sensitivity of the value of Islamic banks to changes in the estimation of β, the main component of the cost of capital, is significantly less then one, based on which it can be determined that the crudeness of the proxies used to determine the cost of capital is of limited importance in the application of the Residual Income model to Islamic banks. Furthermore, due to the absence of market prices which can serve as a bench mark to validate the value calculated using

the Residual Income model, it is not possible to demonstrate the suitability of the Residual Income model to determine the value of Islamic banks in the same way as could be demonstrated for conventional banks. However, the economic principles of Islamic banks and conventional banks are similar, and no indication has been found that the logic of the model can not be applied to Islamic banks. The findings are indicative of the possibility of applying the Residual Income model to determine the value of Islamic banks, as well as the potential to apply the model such that comparisons can be made with conventional banks once the issues found are resolved.

From the analysis of Islamic bank data it appears that the inclusion of Unrestricted PSIA in capital results in higher volatility of the value of the bank calculated using the Residual Income model defined in equation (9), which is in part related to the movements in the funds deposited with the bank, and not necessarily a result of more volatile financial performance. Due to the fact that withdrawal and deposit information is not available in the financial statements, this can not be catered for in an external analysis. As has been observed from the individual Islamic banks' results (figure 6), the value created as a percentage of capital when including Unrestricted PSIA is in general lower, but follows roughly the same trend as the value created as a percentage of capital excluding Unrestricted PSIA, the difference being explained by the *Mudarib* share. Due to the absence of information on movements of funds on Unrestricted PSIA, the results including Unrestricted PSIA can not be interpreted easily. The choice for inclusion or exclusion of Unrestricted PSIA when determining the value of an Islamic bank will therefore depend on what

one wants to measure; return on equity or return on assets. For the former the Unrestricted PSIA should be excluded, for the latter included.

9.3. Research Contribution

The contribution of this research is firstly to identify whether the Residual Income model can be applied to determine the value of conventional banks. In this respect, this research provides evidence that the Residual Income model can, to a significant degree, capture cross-sectional differences in stock market value of conventional banks over a significant period of time. Secondly, the Residual Income model is adapted for application to Islamic banks. Fir this purpose, it was necessary to use proxies for β in estimating the cost of capital, expected future growth, and the risk-free rate of return, since the necessary market data were not available. However, as can be seen in table 23, the sensitivity of the value of an Islamic bank to changes in β is significantly less then 1, which implies that the use of proxies does not considerably interfere with the application of the model. The lack of market data means that (1) proxies for β, expected growth, and the risk-free rate have to be used, and (2) the validation of the application of the model can not be carried out by using market prices as a benchmark, as is the case for conventional banks. However, given the fact that the economic principles of conventional and Islamic banks are the same, the results are validated against the results of conventional banks.

9.4. Future Research

As a result of the small sample size, the relatively inefficient market and other issues surrounding the application of a Residual Income model to Islamic banks, the research presented here will form a starting point in the area of valuation for this specific part of the banking industry. Conclusions that are drawn in this research in relation to the application of Residual Income models to determine the value of Islamic banks are subject to re-validation once more market data and a larger sample size are available. Furthermore, future research can be foreseen in the area of application of other models besides the presented residual income or economic profit models, all of which require market data inputs beyond what is currently available. With the growth of the Islamic banking industry both in size and geographical spread, more data will become available, and the results presented here could be revalidated in future using a larger sample. Although future empirical research can only be carried out once sufficient market data is available, the following topics have been identified for future research:

- Test the valuation of Islamic banks using a larger sample. A potential measurement error currently occurs due to the size and diversification of the sample population. Once more Islamic banks enter the industry and longer periods of historical data become available for a larger number of banks, future research will be required in order to determine the significance of the measurement error;
- Validate the Residual Income model for Islamic banks against market returns in order to determine whether, in line with conventional banks, a

significant part of the cross-sectional returns can be explained by the value resulting from the Residual Income model;

- Test whether the observation that the accounting regulation in relation to profit smoothing to Unrestricted PSIA indeed has the effect that going forward, returns to Unrestricted PSIA will increasingly follow a pattern similar to that of shareholder returns.
- Once Islamic Capital Markets exist for a period of time and start to reach maturity, the application of 0% as the real risk-free rate of return needs to be researched further.

Glossary of Terms

Term	Definition (Vogel and Hayes (1998))
Ijara'h	Contract of lease and hire.
Istisna'a	Contract providing for the manufacture and purchase of a specified item.
Mudaraba	Form of partnership to which some of the partners contribute only capital and others only labour
Mudarib	Partner contributing labour in a *Mudaraba*
Murabaha	Sale at a percentage mark-up; one of the sales in which the price is stated in terms of the sale object's cost to the seller, the others being sale at cost and sale at discount.
Musharaka	Profit sharing contract in which the bank and the customer agree to join in a temporary partnership to effect a certain operation within an agreed period of time.
Qard al Hassan	Repayable, interest free loan e.g. for study or marriage purposes.
Rabb al Mal	Lit., the owner of the property; a partner who contributes capital.
Riba	Lit., interest, but interpreted universally as the prohibition of charging any interest.
Salam	Lit., advance, loan; purchase of item known by specification or description for delivery at a later specified time, with payment of price in full at time of contract
Shari'a	Islamic law of human conduct derived from the *Qur'an* and the *Sunnah*
Sunnah	Deeds and sayings of the Prophet Mohammed
Wakala	The contract of agency
Zakah	Religious alms applied annually to wealth in the form of liquid assets at the rate of one-fortieth of the value of the value of the assets. The proceeds can only be used for charitable purposes.

Appendix A – Deriving Future Return On Equity Estimates

The future Return On Equity (ROE) estimates, as used in the first component of the Residual Income Model, are calculated in the same way as done by Frankel and Lee (1998) and are reproduced below. Contrary to Frankel and Lee, the book value is not recalculated, since Datastream already provides the average book value over a given period.

Three future ROE estimates are required, which are derived using the I/B/E/S consensus Earnings Per Share (EPS) estimates F1MN and F2MN. Year-end book values are dependent on current year ROEs, and a sequential process is used to estimate future ROEs.

Estimating $FROE_t$

Forecasted ROE (FROE) for year t is computed as the year t consensus forecast, divided by the average book value per share during the period t-1. Use of the average book value rather than year-end reduces the chances of extreme outliers, either positive or negative.

$$FROE_t = \text{F1MN}/[(B_{t-1} + B_{t-2})/2]$$

Estimating $FROE_{t+1}$

$FROE_{t+1}$ and is calculated based on the two-year consensus forecast (F2MN) in accordance with the following equation:

$$FROE_{t+1} = \text{F2MN}/[(B_t + B_{t-1})/2]$$

Estimating $FROE_{t+2}$

$FROE_{t+2}$ and B_{t+2} is calculated based on the two-year consensus forecast (F2MN) in accordance with the following equation:

$$FROE_{t+2} = [F2MN(1 + LTMN)]/[(B_{t+1} + B_t)/2]$$

In the event LTMN is not available, $FROE_{t+1}$ is used as a proxy for $FROE_{t+2}$.

Appendix B – Sample details

All amounts in USD per share

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B001	Alabama Nat'l Banc	US	7	Price				18.0533	25.8350	25.9850	19.7833	26.0833	34.3817	44.0400
				Value				8.9172	9.7628	9.5560	10.3565	21.7828	27.0937	28.3580
B002	Amcore Financial Inc	US	10	Price	12.9883	12.7100	14.2917	17.1100	24.8350	22.3400	23.0533	20.1583	22.6600	22.2233
				Value	9.9957	11.3313	7.6470	9.8428	11.2920	10.9099	10.6882	15.0663	16.3947	19.7497
B003	Associated Banc-Corp	US	10	Price	15.0533	15.2917	21.4617	23.3317	34.8917	27.9700	27.3850	28.0500	31.6133	34.0467
				Value	11.0493	13.6716	10.5983	13.7732	11.0109	11.7983	11.9330	19.9711	26.1967	28.9975
B004	Ameriserv Financial	US	10	Price	3.7633	3.2350	5.1467	6.5200	10.5750	8.9067	5.4200	4.2617	4.4667	2.8600
				Value	5.2272	6.2122	4.6585	7.2585	7.0765	6.1803	5.0101	7.1890	7.6726	7.0858
B005	Bankcorp Rhode Islan	US	5	Price						11.2517	9.8267	13.3983	18.0083	22.9467
				Value						10.2348	9.4891	18.5800	22.4043	25.8951
B006	Boston Private Fin'l	US	7	Price				5.2733	8.3033	8.0750	8.4683	18.4083	21.8917	19.9067
				Value				3.7419	2.9244	3.4382	3.8660	8.7258	9.2081	11.5583
B007	Bsb Bancorp, Inc.	US	10	Price	10.7417	12.6867	16.3200	17.5700	33.5833	30.5667	19.7083	14.7083	25.5867	21.8683
				Value	12.4916	14.0731	9.9906	13.1319	14.3106	15.9024	15.1494	17.8855	23.9549	19.1497
B008	Capital Crossing Bk.	US	5	Price						13.0250	12.6050	11.5033	19.8767	25.9350
				Value						10.6893	9.8059	21.8648	29.8977	35.9250
B009	Citizens Banking	US	10	Price	16.1383	17.7367	20.3617	21.0000	31.8867	33.0333	21.3150	26.9483	32.7017	25.1983
				Value	13.9646	14.2810	14.5297	16.5153	14.8893	14.6355	12.7317	20.4935	23.3850	20.8916
B010	Coastal Bancorp, Inc	US	9	Price		9.6517	11.6117	15.4433	21.4433	17.0017	17.0533	23.3867	28.8250	31.6767
				Value		15.2272	8.6402	10.9580	11.4559	11.8299	10.7941	32.5880	44.4339	28.9891
B011	Commerce Bancshares	US	10	Price	12.4100	12.4367	17.8450	23.0517	34.8150	34.2333	28.2000	36.3933	36.7517	39.8133
				Value	11.0155	12.8123	8.1976	10.1938	11.1683	11.8029	12.8801	24.2032	29.2247	33.0147
B012	Compass Bancshares	US	10	Price	9.7983	9.9000	14.3567	17.4000	28.8750	25.0650	20.6883	23.1283	28.0350	31.2483
				Value	8.5952	9.9729	7.1258	8.7365	9.9672	9.3130	9.4800	19.1428	23.6900	26.3259
B013	Community First Bank	US	10	Price	6.5033	6.9383	11.0233	13.8867	25.4083	20.5233	14.2850	18.7017	25.9650	26.5367
				Value	6.3958	7.0169	5.4818	6.9784	8.5977	7.8253	7.0894	13.8622	18.3383	18.9324
B014	Citizens First Fin'l	US	5	Price						14.7100	11.9300	11.8983	17.7583	24.3917
				Value						12.8634	14.4026	19.1384	21.6791	23.4813
B015	Commercial Bankshare	US	8	Price			9.3767	10.1350	18.0783	16.9517	16.6167	14.1667	19.4533	26.9317
				Value			5.5126	6.3804	7.8300	8.2068	8.3579	12.9668	16.4160	19.4622
B016	Columbia Bkg Sys Inc	US	8	Price			5.5550	7.5050	13.8583	13.2917	10.3900	13.3567	12.9417	13.0183
				Value			3.5418	4.6068	5.4667	5.2711	5.8467	11.9145	15.8060	16.2524
B017	Corus Bankshares	US	10	Price	18.8233	16.4983	25.5217	32.9583	38.1683	32.8967	23.1467	47.2117	44.4450	44.1800
				Value	12.0783	14.9717	10.5492	15.8502	20.1355	19.5094	18.8997	39.7636	46.1653	49.2574
B018	First Federal Banc	US	5	Price						19.3033	15.6483	19.0733	22.7183	25.5067
				Value						14.0807	15.6354	25.2188	29.6247	34.6764

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B019	North Central Banc	US	6	Price					19.2933	17.0533	15.2300	18.3883	20.4300	31.5750
				Value					15.4618	13.6484	13.5101	23.4930	29.0508	34.4529
B020	Fidelity Bankshares	US	7	Price				17.8967	30.9083	22.4683	14.8767	22.1183	16.5200	18.3917
				Value				7.1618	8.7180	9.4963	8.5200	14.8056	12.4868	13.6111
B021	Flushing Fin'l Corp	US	6	Price					10.1750	10.5133	9.7550	11.6250	17.0117	16.7083
				Value					8.3562	6.1245	6.1364	12.3710	15.4801	16.5397
B022	First Indiana Corp	US	10	Price	7.7483	7.0500	11.3783	14.5900	19.9467	15.5833	16.9583	18.2000	17.6767	19.0000
				Value	8.1478	10.2309	4.2163	6.8936	7.4881	7.7234	8.9704	18.0857	21.1634	21.3362
B023	Fifth Third Bancorp	US	10	Price	10.1083	9.4367	13.9967	19.2400	35.2217	47.2517	45.1333	57.6800	61.3050	59.2567
				Value	4.7659	6.6439	4.1355	6.0751	6.0156	6.6005	7.4838	19.7172	31.0428	29.9149
B024	First Midwest Banc	US	10	Price	10.9667	10.1067	12.1683	16.6833	22.3817	19.9333	20.2967	22.6333	28.4633	26.8300
				Value	7.9904	8.1550	6.7352	7.2543	8.8646	7.4343	6.8485	12.7016	14.7081	16.5668
B025	Firstmerit Corp	US	10	Price	12.8433	11.8983	14.6900	17.7200	28.0650	26.2950	21.7567	26.1017	27.0750	21.7483
				Value	9.2007	10.5146	7.0643	8.6313	9.1223	9.6964	8.1413	18.1103	22.4803	22.4486
B026	First State Bancorp	US	8	Price			8.0967	9.8483	13.7933	13.2350	13.6000	14.2383	20.7833	25.2267
				Value			4.7790	6.4923	6.9414	7.0400	7.4988	14.2425	17.4674	22.8916
B027	First Fed Cap Corp	US	10	Price	4.8617	4.9167	6.1533	8.0833	15.3983	15.3050	13.3500	14.0533	15.5517	19.1600
				Value	5.5579	6.3598	3.8933	5.0912	5.8265	6.1160	6.3308	12.6356	18.0251	18.6190
B028	Fulton Finl Corp	US	10	Price	6.9367	7.3000	8.9617	9.6650	15.5950	13.8283	11.9933	16.4467	16.6983	17.1350
				Value	5.2074	5.9955	4.4719	5.9748	5.9437	5.4110	5.5908	10.3503	13.3802	13.3900
B029	Glacier Bancorp, Inc	US	7	Price				10.8050	15.7017	16.5450	13.1450	11.5617	18.6633	21.6767
				Value				6.2477	7.5222	8.0962	7.8009	10.5351	14.8937	18.2016
B030	Gold Banc Corp, Inc.	US	5	Price						15.7100	9.0950	5.0383	7.1850	10.0250
				Value						4.6117	4.2850	6.7195	9.0527	9.7869
B031	Huntington Bancshr	US	10	Price	10.9117	10.2883	14.5800	17.8583	26.6017	25.0783	20.3217	16.0333	17.2533	18.9933
				Value	7.5964	9.5171	5.6162	7.9938	8.8350	8.0094	7.7063	14.4078	17.0282	17.2053
B032	Hancock Holding Co	US	10	Price	18.8183	17.0167	21.5700	27.3050	40.0333	29.4433	25.7217	24.9017	29.3817	44.7267
				Value	14.2932	16.5429	13.0580	15.8198	17.4229	16.7547	17.1448	24.8417	27.2401	30.5970
B033	Independent Bank	US	10	Price	3.9900	4.8317	5.6883	7.5100	13.4250	11.2100	7.9700	11.7900	17.3950	20.5667
				Value	3.7988	4.3235	3.6304	4.8866	5.3056	5.8302	6.2254	9.4474	11.7232	18.1915
B034	Iberiabank Corp	US	6	Price					28.4600	22.8200	13.6483	21.3767	27.6250	39.8067
				Value					14.1094	14.4926	14.1211	26.3397	33.1135	34.7397
B035	Interchange Finl Svc	US	10	Price	4.2733	4.2783	5.9850	7.3267	13.2933	10.9633	11.0983	10.1217	12.8017	16.5067
				Value	4.0512	4.5520	3.7733	4.5461	5.1566	5.3094	5.9302	8.3351	10.8018	13.0573
B036	Independent Bnk Corp	US	10	Price	4.5950	5.4083	7.2533	9.8450	17.2100	16.8567	12.2083	13.4067	21.5733	23.5000
				Value	3.9731	6.4042	3.1315	5.7835	6.4715	5.9644	5.8981	12.9883	19.3018	23.1253
B037	Itla Capital Corp	US	5	Price						15.2217	12.3450	18.9800	20.5483	34.2367
				Value						13.5057	17.4543	26.1088	31.4375	35.9214
B038	Mercantile Bankshare	US	10	Price	13.0000	13.1467	18.5533	21.4500	37.3783	36.6583	30.6933	41.4283	43.5367	38.7983
				Value	10.3302	13.8996	6.6993	9.5091	10.5982	11.1823	11.8085	26.2715	32.8804	32.8032

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B039	Northern Trust Corp	US	10	Price	9.9850	8.7400	13.2133	18.5167	32.7267	42.4917	52.2100	74.9450	60.1650	35.9583
				Value	5.5777	7.6972	4.2744	6.4025	7.0486	6.9304	7.5529	19.7571	30.1860	27.7318
B040	Oceanfirst Finl Corp	US	5	Price						10.6933	11.0617	15.0267	16.2433	22.1667
				Value						6.4858	6.4714	13.3086	16.1329	15.2238
B041	Southwest Bancorp	US	7	Price				13.4717	17.9617	17.4333	13.2233	11.8833	18.0333	25.8550
				Value				7.9168	8.1012	10.9892	12.1413	15.7529	19.1916	21.5956
B042	People's Bank	US	10	Price	6.0000	8.0983	12.6683	19.2017	36.1367	27.6067	20.8250	25.2100	21.2300	25.5683
				Value	7.9211	10.6937	7.9477	11.1306	9.1725	8.8121	9.2825	22.8763	25.1026	22.2184
B043	Provident Bankshares	US	10	Price	6.5733	7.5583	10.5583	14.5550	24.5433	22.4700	15.5333	20.6750	24.3150	23.0250
				Value	7.1510	8.6201	5.7743	8.4618	7.8085	8.1988	7.9344	16.9617	19.2731	18.8567
B044	Premier Fin'l Banc	US	6	Price					23.6917	16.9500	9.4067	5.8133	8.4600	7.6750
				Value					11.4829	12.0839	10.6575	10.5947	11.3309	12.1423
B045	Provident Financial	US	10	Price	14.4817	14.5383	21.0517	36.1433	48.8350	38.0350	33.8200	33.7417	24.6117	26.7867
				Value	12.3596	11.5866	12.7673	15.0581	14.7023	14.5339	15.4031	31.1822	29.3144	30.1455
B046	Republic Bancorp Inc	US	10	Price	5.2633	4.3433	4.9933	5.9200	10.6567	9.1783	8.6183	9.4433	12.1400	11.9483
				Value	5.1084	4.2456	3.4295	4.0746	3.4791	4.0205	4.5838	7.3697	9.7544	10.6851
B047	Republic Bancshares	US	7	Price				14.9500	25.8150	14.4717	12.3500	11.0517	13.1883	19.9767
				Value				10.0338	12.7314	11.7349	12.3524	18.4621	21.2512	21.9315
B048	Riggs National Corp	US	10	Price	8.6083	8.2617	13.2617	17.3667	26.1000	20.3083	12.1167	14.2283	14.2083	15.7083
				Value	1.6207	4.6975	5.9571	8.7886	7.9456	11.2918	10.0206	17.2343	16.9748	17.3392
B049	Seacoast Banking	US	10	Price	5.7983	5.6450	7.3400	8.6233	12.5333	9.3483	9.5050	9.2833	15.0250	18.7017
				Value	5.3791	5.5364	3.0474	4.6576	4.9750	4.9112	5.4743	6.9301	9.6698	9.5295
B050	Sterling Bancshares	US	9	Price		2.2800	3.4633	5.4683	9.3183	9.7017	7.3717	12.3800	12.8100	12.2467
				Value		2.2567	2.0419	2.6892	3.1825	3.4442	3.5127	6.0954	8.5062	9.3543
B051	Silicon Valley Banc	US	10	Price	2.4683	3.3267	5.6983	8.0533	13.5950	9.9633	25.2933	33.5850	26.2750	18.3550
				Value	1.8141	3.3779	1.9146	3.2774	3.8811	4.5136	7.3175	23.9073	29.1379	26.3231
B052	Sterling Financial	US	10	Price	6.9500	5.8100	8.5250	8.8483	13.1233	10.3683	7.1417	8.0817	11.1300	17.5500
				Value	8.4915	7.9073	6.8563	7.1674	8.6484	8.0134	7.5474	13.7807	17.1726	24.0577
B053	Sun Bancorp, Inc.	US	5	Price						15.0200	7.8167	6.9083	10.1250	13.1850
				Value						8.4535	7.7631	11.8032	12.3705	13.2612
B054	Southtrust Corp.	US	10	Price	6.1800	6.1417	8.5150	11.7033	19.6250	18.3333	16.7983	20.2567	24.3500	25.3633
				Value	5.1825	6.7851	3.6839	5.3226	6.4379	6.4234	7.1756	15.9518	21.7123	20.0583
B055	1st Source Corp	US	10	Price	8.3483	9.6933	13.2667	14.7900	23.5667	28.4167	21.8833	18.4017	20.8067	16.6417
				Value	7.3591	8.2714	6.6791	11.1704	9.7019	10.7187	11.3506	17.6571	21.2983	19.0983
B056	S&T Bancorp, Inc.	US	8	Price			14.2817	15.5017	21.2833	27.5750	22.1467	21.6683	24.3683	25.7650
				Value			6.4277	8.1355	9.3531	9.6195	9.5196	13.8598	16.0497	16.5548
B057	Suffolk Bancorp	US	10	Price	5.8450	6.6567	8.3150	9.7617	15.1800	13.3733	13.1500	15.4633	27.3200	32.1733
				Value	5.5074	6.3418	4.4179	5.9863	5.4078	6.0629	7.1546	10.2729	12.7877	14.3997
B058	Susquehanna Banc	US	10	Price	12.2483	9.7250	12.0100	14.8100	24.4650	20.8183	15.7000	16.4500	21.4000	21.0350
				Value	9.4404	10.2533	7.6554	9.2432	9.0223	9.1418	9.5495	15.0080	16.9743	17.2960

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B059	Trustmark Corp	US	10	Price	7.5433	8.4500	10.9150	12.8417	22.3300	21.8350	20.8117	20.5433	23.9850	23.9517
				Value	7.2128	7.6868	6.9147	8.5875	8.5963	8.6984	8.8343	14.0153	18.1472	18.8160
B060	The South Finacl Grp	US	10	Price	9.7817	10.9433	14.3400	16.2350	21.4483	24.6983	17.1067	13.2500	17.7367	20.9683
				Value	7.2212	7.2487	6.3112	9.6235	11.2323	11.9398	11.5983	13.2825	16.4412	20.4045
B061	United Bankshares	US	10	Price	13.1217	11.8417	14.9983	16.3617	23.4517	26.5167	23.1117	21.3450	28.2350	29.6333
				Value	8.5637	9.6241	8.4937	10.3744	10.0680	9.9557	9.4288	15.2661	20.1750	21.2000
B062	Umb Financial Corp	US	10	Price	24.0950	21.7883	30.4133	32.8967	47.1850	39.6550	34.9417	34.9317	40.7017	38.9483
				Value	23.0283	23.5958	17.4512	22.0765	25.3725	25.0822	25.7896	38.3194	44.3901	44.9243
B063	United National	US	10	Price	10.6917	11.9400	12.6117	14.6567	22.8067	21.5583	19.4900	18.8350	23.2917	23.2583
				Value	9.1873	9.4315	9.0840	10.6906	11.2003	9.7556	7.0807	14.7988	20.3821	22.9900
B064	Westamerica Bancorp	US	10	Price	9.1383	10.0683	14.4117	19.3300	33.8100	35.9817	26.7033	40.3033	38.7633	40.3900
				Value	7.2442	9.7806	6.0549	9.5612	9.8202	8.9779	7.4619	17.3563	21.0919	20.7859
B065	Whitney Holding Corp	US	10	Price	15.0833	14.8467	20.4250	23.3633	37.1717	25.2017	24.5417	25.5367	29.9233	33.0450
				Value	18.4705	16.6240	20.8039	19.6054	15.6601	14.4898	13.5980	23.7847	26.0265	29.2007
B066	Yardville National	US	6	Price					17.3983	13.5733	11.0433	12.5750	12.3367	16.8867
				Value					7.1987	6.8116	7.1735	15.4730	18.1481	26.9966
B067	Zions Bancorporation	US	10	Price	9.2083	9.0300	18.4767	25.9267	43.5417	57.7000	58.2533	59.6050	52.2583	40.7167
				Value	7.4732	9.4965	5.6071	8.5285	10.4888	13.1192	18.3739	28.4056	38.4761	41.0373
B068	Abbey National	UK	10	Price	7.4700	6.7500	9.8750	12.5833	17.9067	20.9500	14.9200	17.9267	14.3333	8.1117
				Value	3.8714	6.7125	9.6104	2.7598	5.3758	5.8952	7.4187	11.5207	13.0047	14.4250
B069	Dexia	BE	5	Price						16.3100	15.1367	17.3717	13.9950	11.9783
				Value						9.8819	6.6469	7.0243	9.4802	14.0147
B070	Fortis	BE	10	Price	8.9150	9.2333	13.4817	17.4500	23.6383	38.8533	33.8683	32.0367	24.6050	16.9250
				Value	4.9786	10.8429	9.6946	7.0741	7.7979	8.3572	10.3086	12.5885	21.4780	21.5375
B071	Kbc Bank & Ins. Holding	BE	10	Price	21.8900	20.8083	27.9033	31.9450	42.0783	79.7017	51.1483	43.9017	32.0350	31.5083
				Value	11.1678	22.0415	23.5992	16.4464	14.5188	11.0936	20.9914	32.0779	47.5084	65.2315
B072	Barclays Bank	UK	10	Price	2.3150	2.3400	2.9217	4.3050	6.7617	5.4550	6.6000	7.8167	8.0550	6.0917
				Value	1.0983	2.8196	4.4390	1.0510	2.2202	1.9283	2.3754	5.9044	9.0147	10.2116
B073	Bankgesellschaft Berlin	DE	10	Price	23.9717	18.5417	20.4950	14.8383	17.7700	12.9000	13.1567	10.7917	2.1767	1.9067
				Value	4.9306	22.1747	24.9352	15.9032	11.1961	17.8449	24.8997	7.9789	5.2464	6.0501
B074	Bhw Holding	DE	5	Price						15.9133	17.8150	27.1617	23.1733	9.0717
				Value						11.3477	9.5792	8.3369	8.3557	8.3411
B075	Bayer. Hypo-& Vereinsbn.	DE	10	Price	30.9567	27.3000	29.3717	39.2333	64.5350	77.6867	68.3317	56.9000	30.7650	15.6600
				Value	12.0308	24.2518	27.1462	20.7664	18.3106	35.9827	29.0064	25.1366	45.8344	44.2803
B076	Commerzbank	DE	10	Price	21.5967	20.7450	23.6117	25.3633	39.4583	30.1017	36.6183	29.2933	15.8283	8.2917
				Value	10.6406	19.4382	22.9344	17.9341	13.5983	24.6505	22.2160	17.5128	20.1788	28.0429
B077	Deutsche Bank	DE	10	Price	48.1133	44.6800	46.6517	45.6300	65.6533	56.7183	81.9983	87.2917	69.4433	46.9817
				Value	15.5581	32.7397	38.7232	30.0025	21.1008	37.7168	27.1090	29.7840	67.4648	78.4534
B078	Danske Bank	DK	7	Price				7.8517	13.1583	13.1717	10.5383	17.8967	15.9133	16.9350
				Value				4.1650	2.9475	11.2161	6.0237	5.9105	17.6822	22.7802

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B079	Jyske Bank	DK	7	Price				14.9050	24.2617	18.0800	19.4900	20.2333	21.0417	27.1233
				Value				12.8053	9.4043	20.3206	15.0643	15.3276	33.2939	41.2903
B080	Spar Nord Bank	DK	7	Price				35.9050	58.2000	44.5300	39.0383	41.6833	38.7617	48.8483
				Value				20.7069	19.8486	52.2235	41.3718	40.3004	48.3813	57.9722
B081	Sydbank	DK	7	Price				39.1033	56.4683	41.7417	40.5400	40.0550	51.7183	70.4533
				Value				33.5358	21.4728	55.9645	40.9951	42.4062	81.8602	91.1421
B082	Banco De Andalucia	ES	10	Price	27.7167	27.4183	36.3617	35.8133	41.4883	43.1517	34.4050	27.3150	33.5033	54.3800
				Value	11.9313	24.9715	28.8076	19.3581	13.5615	20.6211	22.3659	29.5778	30.8280	40.8723
B083	Bbva Group	ES	10	Price	2.4500	2.7633	3.9583	5.9233	10.6517	15.5467	13.7050	15.3833	11.9850	9.9167
				Value	1.1522	3.0017	3.2007	1.9012	1.2399	1.9669	4.1212	5.5477	7.0254	7.5106
B084	Bankinter Group	ES	10	Price	13.7300	13.4917	16.4233	24.7033	28.5467	35.5167	54.2433	37.6367	28.0567	25.5033
				Value	4.4370	13.2066	13.1391	7.9225	5.4115	7.8295	9.9602	12.8830	13.8209	19.9698
B085	Banco De Valencia	ES	5	Price						7.8867	7.0900	7.6567	8.4400	12.0283
				Value						3.5824	3.9124	4.7326	4.8754	6.7711
B086	Banco Guipuzcoano	ES	5	Price						12.7500	12.7050	15.1733	17.0450	17.3683
				Value						7.2375	7.7009	8.9342	8.8276	11.5879
B087	Banco Popular Group	ES	10	Price	14.0433	15.0100	22.7500	24.2367	35.5217	37.0417	31.7467	33.9317	32.8067	41.3150
				Value	5.4279	13.8280	15.4814	9.5629	5.7345	8.6940	9.3200	15.2365	16.0089	23.7604
B088	Santander Ctrl. Hispano	ES	10	Price	3.2300	3.1033	4.0300	4.9600	8.0183	9.4667	11.2667	10.8950	8.2583	6.9250
				Value	0.8326	2.2707	2.6142	1.3851	1.0712	1.5044	1.8785	4.0654	5.1504	5.3487
B089	Banco Zaragozano	ES	10	Price	2.7200	2.9783	3.2583	4.1883	5.8433	5.9950	5.6667	8.0883	8.0200	8.9800
				Value	1.8366	3.3364	3.2741	2.7935	1.9918	2.9986	3.1188	4.2128	3.9339	5.1816
B090	Bnp Paribas	FR	9	Price		23.4300	21.8350	18.8550	25.8050	40.3467	44.2750	44.8500	45.0250	40.5733
				Value		27.5116	29.9068	20.3433	16.9822	14.4867	10.4971	20.1749	77.9969	73.0290
B091	Natexis Banques Pop	FR	5	Price						64.4250	70.7700	88.9467	84.8283	80.9867
				Value						50.5989	33.2702	61.4946	152.8265	117.2940
B092	Societe Generale Group	FR	9	Price		26.0050	30.7450	25.9017	32.9150	40.6050	55.2617	64.3300	56.3967	57.5350
				Value		38.2399	39.8375	22.0509	19.2941	14.3883	14.2667	31.0552	109.3905	98.6583
B093	Nat Bank Of Greece	GR	5	Price						33.6583	45.5350	33.6017	21.1717	12.6850
				Value						3.1998	1.5322	92.0769	28.6986	36.3348
B094	Abn Amro Holding	NL	10	Price	9.1733	8.7050	11.4983	15.8083	19.5950	20.7467	23.6967	23.8300	16.5733	16.1617
				Value	4.7484	9.0907	9.8849	7.2150	5.0834	8.0237	5.5443	9.4233	25.6837	25.6489
B095	Ing Groep	NL	10	Price	9.3517	9.3900	13.4300	17.7000	21.2183	29.8550	29.2967	38.9017	24.8917	17.1500
				Value	5.6995	10.1496	9.6504	9.4696	8.1686	16.0145	11.4379	11.5819	30.0799	33.7914
B096	Hsbc Holdings	UK	9	Price		3.5467	5.2250	7.3517	8.2417	9.1700	13.0883	14.9600	11.6583	11.1800
				Value		4.0938	9.0981	1.3738	2.9986	2.3887	2.8033	9.5052	17.1024	17.2747
B097	Banca Intesa	IT	8	Price			1.1417	1.0362	3.8083	5.7930	3.8913	4.8968	2.4430	2.1538
				Value			1.6376	0.9239	0.9968	1.0405	1.4329	1.1391	12.5184	4.8433
B098	B.P.C.& I.	IT	6	Price					14.7217	17.8650	30.7650	15.5400	8.5983	8.0850
				Value					5.8295	6.4970	6.7165	5.1336	67.6707	28.1970

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B099	Capitalia (Late B. Roma)	IT	8	Price			3.9990	3.2398	4.1015	6.5518	5.0597	4.5640	2.0837	1.3497
				Value			8.2648	4.9196	0.9737	2.6342	3.1126	2.4745	9.2729	5.3924
B100	Banca Nazionale Lavoro	IT	5	Price						2.8875	3.3858	3.2560	2.0715	1.1703
				Value						1.0503	1.4641	2.0096	8.1532	3.6190
B101	Banca Popolare Bergamo	IT	5	Price						23.8100	23.8033	19.4600	16.1917	17.9150
				Value						11.0704	11.3675	8.1055	24.8550	20.5205
B102	Banca Popolare Di Milano	IT	5	Price						8.5182	7.7363	5.1442	3.4880	3.6640
				Value						4.1935	5.0207	4.1529	10.0353	7.4809
B103	Credito Bergamasco	IT	7	Price				13.9530	19.5398	19.1463	17.3767	17.2110	12.6973	15.1655
				Value				7.6683	6.7444	8.4914	10.2303	9.3114	14.4945	16.2843
B104	Unicredito Italiano	IT	8	Price			1.1763	1.1412	3.1310	5.6708	4.5707	5.2930	3.9262	3.9575
				Value			1.5762	0.9475	0.4599	0.9695	1.2679	1.1025	5.5328	3.8052
B105	Banca Popolare Di Verona	IT	5	Price						12.9883	12.2688	11.3545	9.8470	11.2183
				Value						3.0998	4.6417	4.3679	11.5941	10.9049
B106	San Paolo Imi	IT	8	Price			5.7380	6.0965	9.7067	16.6912	12.9943	16.6258	10.5145	6.8165
				Value			8.5479	5.5808	3.1262	4.0832	4.7399	3.0208	16.6705	10.0798
B107	Lloyds Tsb	UK	6	Price					12.6267	13.9550	11.4617	10.6267	10.5417	7.0767
				Value					2.8467	2.5426	3.2252	5.7552	9.2987	7.3056
B108	Alandsbanken	FI	8	Price			20.2617	21.2483	20.6967	22.3050	16.1633	16.4717	14.4283	17.7833
				Value			7.7773	7.3420	6.1086	7.6975	7.7103	7.8543	8.2979	9.7162
B109	Okobank Group	FI	8	Price			3.9683	6.9383	7.9917	9.1533	11.4800	12.7783	12.9117	15.0117
				Value			11.0502	11.0230	7.9441	10.6306	6.3034	14.9602	13.5293	15.6347
B110	Bnbank	NO	6	Price					27.6983	24.4683	22.8783	22.0750	20.7350	25.9550
				Value					17.5381	22.6177	20.2416	20.3730	24.7398	35.7004
B111	Dnb Holding	NO	5	Price						3.5317	3.9367	5.1417	4.4650	4.9217
				Value						6.9944	2.2140	3.0173	8.3698	9.2530
B112	Gjensidige NOR	NO	6	Price					27.8883	19.1417	22.8767	28.6000	30.1833	33.3400
				Value					28.1941	37.1708	24.4541	28.7036	45.5458	37.0450
B113	Sparebank 1 Midt-Norge	NO	6	Price					32.3650	23.7317	28.7450	21.5267	22.1500	21.7467
				Value					32.3054	53.5122	32.8510	32.9559	51.3681	56.5511
B114	Sparebanken Moere	NO	6	Price					25.9317	20.5800	24.2000	21.8583	22.4650	25.4450
				Value					22.1687	39.4007	25.2495	28.7628	46.3704	59.8960
B115	Nordlandsbanken	NO	6	Price					6.5650	5.3817	6.6983	6.8450	6.0050	4.6500
				Value					4.8671	8.2113	7.2532	6.7661	6.8662	5.0399
B116	Sparebank 1 Nord Norge	NO	6	Price					25.0517	19.7200	21.8367	19.7433	19.3483	18.5267
				Value					27.8140	40.6390	31.2069	34.7553	45.1243	54.5082
B117	Sandnes Sparebank	NO	6	Price					22.0717	15.9567	17.7100	17.0817	14.3783	16.5000
				Value					18.6248	40.1227	19.4038	21.9657	30.3812	38.6996
B118	Sparebank Vest	NO	6	Price					28.3967	16.5717	24.5867	15.6950	13.2050	14.5283
				Value					63.3225	102.7934	74.6215	78.8161	104.4906	133.1010

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B119	Banco Espirito Santo	PT	8	Price			6.3117	7.4733	12.8600	16.2583	14.6817	12.6883	9.8667	12.7333
				Value			5.7306	3.8830	2.7487	5.0130	7.2127	7.5375	10.6751	10.2255
B120	Banco Bpi, S.A.	PT	8	Price			1.5617	1.7700	3.3117	4.6650	3.9050	3.1933	1.9417	2.2583
				Value			2.4321	0.6515	0.2825	0.9275	1.8577	2.4129	5.5921	3.8907
B121	Prudential	UK	10	Price	5.4117	4.9000	6.5783	8.3750	12.2917	14.9917	18.5100	15.3650	11.4133	6.9683
				Value	1.4208	2.4526	4.8290	1.5066	2.4503	2.7707	2.0867	3.6844	3.8861	6.1979
B122	Royal Bank Of Scotland	UK	10	Price	6.3167	5.6917	8.2150	8.5900	11.9600	15.2817	16.0367	23.7050	24.0583	23.4733
				Value	2.6021	4.8646	7.2422	2.3408	4.5728	4.1871	6.1628	10.0819	16.0694	18.5494
B123	Julius Baer Holding	CH	9	Price		99.4867	110.8383	102.3900	181.0117	332.9617	294.6500	515.7767	344.4450	221.9017
				Value		110.7642	51.4304	60.7034	38.6057	91.6955	84.6735	114.3112	209.8770	224.4426
B124	Banq Canton.Vaudoise.	CH	10	Price	246.6533	221.2967	260.6133	234.4367	321.5350	318.2850	309.9567	341.2283	164.1800	58.6100
				Value	276.1210	380.0617	251.6947	229.1143	179.8885	196.9193	230.6252	251.6802	276.5445	270.4482
B125	Bank Sarasin R	CH	10	Price	610.3800	563.9600	541.6417	571.1833	744.2650	1,765.4517	2,063.0900	3,197.0083	2,062.1900	1,076.9033
				Value	228.3922	636.6169	407.7856	441.9517	397.8046	763.8708	695.7327	1,034.1857	2,377.0969	1,728.0639
B126	Credit Suisse Group	CH	10	Price	21.8300	19.2067	22.9767	23.0600	35.1733	36.3267	43.6667	45.0400	40.1250	22.2983
				Value	8.2690	23.6601	12.2498	11.1692	7.8951	14.8475	15.9492	11.4857	32.4205	22.0006
B127	Liecht. Landesbankllb)	CH	8	Price			308.7817	293.5783	395.2517	671.5850	505.2283	517.1050	453.1833	409.0267
				Value			177.4900	157.1092	127.3974	335.5628	273.1687	300.6243	470.9885	523.5440
B128	Ubs	CH	10	Price	36.9433	30.0500	37.7833	28.3800	46.8567	50.5350	43.0850	54.6417	48.8067	49.5317
				Value	10.4684	31.2669	19.1379	16.9755	9.7735	15.6346	14.7638	14.5273	53.2024	44.0953
B129	Vontobel Holding	CH	10	Price	12.7350	11.4083	12.4650	10.7850	16.0667	33.0433	36.3867	54.6567	25.5667	15.9517
				Value	2.8686	7.0782	5.2904	5.5620	5.0937	9.1696	9.9780	15.1704	23.4534	-99.1302
B130	V. P. Bank Vaduz	CH	10	Price	54.5817	55.4933	70.7583	63.2367	93.1733	187.4150	207.3467	210.8117	147.9567	106.7983
				Value	21.3621	53.9003	44.7873	44.6296	30.4492	65.0365	66.9096	75.7555	107.2625	117.0508
B131	Zuger Kantonalbank	CH	10	Price	904.3167	946.6467	1,195.7800	1,121.2417	1,237.6000	1,396.3617	1,318.3017	1,249.4800	1,299.1833	1,611.8150
				Value	520.6680	1,007.4613	736.0736	727.8484	551.6583	818.0044	798.9822	834.9955	914.4616	1,181.5731
B132	Standard Chartered	UK	10	Price	4.6000	4.1933	8.7917	11.8950	10.3750	11.7850	14.5683	15.0333	11.9083	11.3683
				Value	2.2195	4.6508	9.9152	2.2455	4.0456	3.3320	3.5356	9.9763	21.6722	23.1735
B133	Amsouth Bancorp	US	10	Price	9.2350	7.9500	11.4633	14.3283	23.3983	29.1133	18.4800	15.9267	18.9850	19.5850
				Value	7.8166	8.7310	5.5718	7.4110	6.6769	6.8622	7.1722	11.4847	15.5138	15.6274
B134	Bank Of America Corp	US	10	Price	24.6567	23.0733	33.8967	49.9817	60.3233	62.4400	48.8150	48.5333	62.0200	70.2067
				Value	19.0541	31.1829	11.8866	18.2534	24.0033	18.6849	19.4596	50.2141	70.3929	68.2767
B135	Bb&T Corporation	US	10	Price	9.9983	9.5933	13.2483	17.8400	31.0033	39.2733	27.6067	36.9283	35.5617	37.6683
				Value	9.2295	9.6826	6.6727	7.8775	7.4098	8.4767	8.5950	20.1538	26.0498	27.9846
B136	Bostonfed Bancorp	US	6	Price					20.9400	17.8383	15.0867	21.3367	23.8250	27.0850
				Value					11.8680	11.6674	13.4617	25.0144	27.3131	24.9460
B137	Bank Of New York Co.	US	10	Price	7.1483	7.4283	11.8400	17.1667	27.7850	37.3867	38.7217	52.7417	41.9250	25.4550
				Value	5.2069	9.3326	3.2942	5.2835	5.6170	5.6235	5.6810	17.4072	24.3409	21.9740
B138	Banknorth Group, Inc	US	10	Price	5.8017	6.2600	10.5067	13.3150	21.8167	19.2500	14.5200	19.3133	22.5050	22.8417
				Value	6.1593	9.6433	3.7759	6.5824	7.0831	6.6990	6.2159	17.7206	27.4371	26.7032

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B139	Bank Of Hawaii Corp	US	10	Price	13.7800	12.8933	17.6250	20.9783	24.3467	23.0750	17.8267	18.3050	25.5733	30.4617
				Value	12.1888	16.1583	7.3593	10.3414	11.3206	10.6122	10.7136	24.1574	29.9204	27.0621
B140	Bancorpsouth, Inc.	US	10	Price	7.7500	8.3283	11.4033	13.8333	22.3017	18.0100	15.9067	13.3450	16.8100	19.4567
				Value	7.4012	7.9565	6.4557	7.9936	8.8587	9.1151	8.9132	11.8446	13.4936	14.7776
B141	Citigroup Inc.	US	8	Price			9.4283	14.2350	24.0350	23.9767	39.0283	49.3717	46.5033	36.6133
				Value			1.4724	4.5987	6.6461	5.4876	7.2632	27.4792	47.0557	45.7924
B142	Commerce Bancorp Inc	US	10	Price	4.6583	5.7500	7.1433	10.2833	16.3917	22.7667	19.1517	31.6983	39.7983	44.2433
				Value	4.3414	5.6406	4.2791	5.2582	4.9875	5.6347	5.1559	12.6677	18.3883	25.7557
B143	Community Bank	US	10	Price	14.4383	13.0550	16.0017	19.7950	30.8267	29.2517	23.1683	25.8350	26.7583	32.3883
				Value	13.7565	16.0204	10.4936	13.6414	16.5830	16.3722	14.6729	27.1976	28.5208	34.1268
B144	Charter One Fin'l	US	10	Price	6.9817	6.9667	10.8017	15.4650	23.2300	22.5983	16.0633	24.8117	25.7533	29.3617
				Value	6.4755	9.7195	3.3919	5.4454	7.4899	7.5721	7.9509	18.6740	26.4323	26.2548
B145	Cullen/Frost Bankers	US	10	Price	8.6017	7.7900	12.2750	16.6667	28.9150	27.2183	25.3667	39.0433	29.9450	32.8500
				Value	6.4902	9.5547	5.1494	8.0788	8.6666	8.5156	8.4118	18.8415	23.4213	27.1432
B146	Chittenden Corp	US	10	Price	7.3583	8.5433	15.0800	15.5000	27.6217	25.1917	23.3833	24.2833	27.9250	25.7600
				Value	6.6733	10.0321	5.0255	8.6850	9.3303	9.7783	9.6746	15.8879	19.6146	20.7606
B147	Comerica Inc.	US	10	Price	17.8333	16.4450	25.4167	35.8500	58.8717	66.8983	44.5317	58.8450	56.5600	43.8900
				Value	14.3697	20.2911	9.5247	11.7302	13.4342	14.8072	17.7371	42.4204	53.7011	47.7433
B148	City National Corp	US	10	Price	7.7733	10.4200	13.5850	21.3150	34.2817	38.7000	32.1800	36.7600	47.0300	44.5883
				Value	5.7731	9.8285	4.7287	7.2327	9.0657	9.3002	9.6778	27.7849	39.7858	43.0947
B149	Doral Financial Corp	US	10	Price	2.7983	1.8850	3.0800	4.5217	7.4033	13.9600	7.5633	15.9183	21.1267	28.6933
				Value	5.6186	2.7691	1.9115	2.4792	2.7602	3.6443	4.5353	11.2837	19.9799	24.9747
B150	Downey Financial	US	10	Price	11.8667	9.2983	13.9550	18.2933	26.3500	24.2300	19.7817	51.0117	41.2150	39.6883
				Value	12.8835	16.8098	7.5339	11.8287	12.1236	13.2493	14.6666	33.3477	41.9485	45.6222
B151	Fleetboston Fin'l	US	10	Price	16.8950	16.3217	20.1767	25.6517	36.3867	43.6050	33.7317	40.1883	35.4350	25.6783
				Value	12.1350	17.7944	6.9046	10.8058	13.0000	13.1126	12.8817	32.4938	36.5191	32.1353
B152	Firstfed Financial	US	10	Price	8.0200	5.8167	7.0700	11.1633	18.1050	17.4500	14.1267	30.6867	25.7217	28.3000
				Value	8.7805	11.3964	3.5666	5.8299	8.2390	9.1447	9.5916	24.2404	34.9713	33.3828
B153	First Republic Bank	US	10	Price	9.5467	6.9867	8.8200	11.4167	20.5017	16.8250	14.6950	22.5067	24.7800	20.7567
				Value	9.1524	13.0807	3.9701	6.3709	7.9962	8.9859	10.3860	22.3679	29.9803	30.8075
B154	First Tennessee Natl	US	10	Price	9.4750	10.0700	14.9233	18.6967	31.8117	36.3550	27.3967	29.3233	35.6667	36.5050
				Value	7.7951	8.5929	5.7113	7.5004	7.6951	8.0327	8.3517	18.9327	26.9026	28.3607
B155	Hibernia Corp	US	10	Price	7.6700	7.6050	10.5217	13.0850	18.3350	16.5750	10.5317	12.7300	17.5883	19.4283
				Value	5.7585	7.5609	4.6357	6.0353	6.3174	6.6100	6.2543	13.9943	19.1892	18.4642
B156	Hudson United Banc	US	10	Price	12.0283	11.9150	17.5200	20.4100	30.8667	26.4867	22.7267	20.4383	28.9317	31.0667
				Value	8.7057	10.0263	7.1290	8.4970	6.7715	9.2319	9.2853	12.6727	16.9974	18.4176
B157	Irwin Fin'l Corp	US	10	Price	6.1467	6.9300	10.0750	12.9433	20.5683	26.6367	18.2400	20.3233	17.2633	16.4433
				Value	4.6583	6.2701	5.1229	6.8460	5.8654	6.2520	6.7963	14.5141	18.9272	20.0855
B158	J.P. Morgan	US	10	Price	13.3400	12.3350	19.2150	29.8417	35.7700	46.4983	49.7217	49.6783	36.9317	25.2517
				Value	13.5586	18.3227	8.9590	13.7069	14.6913	14.4064	13.8795	38.4869	51.0513	48.5564

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B159	Keycorp	US	10	Price	15.0800	12.6650	17.6250	25.6983	34.4217	31.9900	21.7417	27.5117	24.3117	25.4967
				Value	12.9397	15.1475	7.4102	9.5079	10.3065	10.7413	11.3442	24.3535	21.8023	25.5835
B160	Mellon Financial	US	10	Price	8.9300	8.1083	12.9967	18.0100	29.8433	34.2600	33.1683	47.4283	38.5000	26.8283
				Value	7.5759	8.9919	4.4673	6.4964	6.4674	7.2242	6.8323	15.6472	16.7822	17.1121
B161	Marshall & Ilsley	US	10	Price	11.4333	9.5033	12.7583	17.1333	28.6917	27.6383	29.3650	25.9083	31.0933	27.9433
				Value	7.1150	7.6572	5.1628	6.3977	8.3942	9.1389	8.3972	17.4796	24.2403	22.5402
B162	M & T Bank Corp	US	10	Price	14.1233	13.8450	21.4583	28.6200	44.1350	49.2400	41.5117	65.5683	73.9533	80.7133
				Value	59.2987	76.0942	51.5194	75.7580	105.2802	113.0310	105.1532	43.1848	53.7171	54.0299
B163	Morgan Stanley	US	8	Price			11.9700	16.8867	27.7717	38.4533	66.5567	81.6900	56.4167	41.8733
				Value			3.8675	5.4229	7.6240	7.4070	10.2305	47.2657	93.1888	76.8314
B164	National City Corp	US	10	Price	12.4067	12.7917	16.1650	22.4967	31.4000	35.9417	22.4617	28.5333	28.8900	27.8300
				Value	9.1610	12.0483	6.4752	9.1977	9.9754	9.6198	8.7590	18.6149	23.0246	24.0183
B165	National Commerce	US	10	Price	5.8150	5.8000	6.5350	9.2250	16.6517	18.6150	22.0533	25.0117	25.2100	23.9383
				Value	3.4103	3.2541	3.8465	4.4803	3.6873	4.0659	4.9653	11.3109	22.6698	20.4659
B166	North Fork Bancorp	US	10	Price	4.3950	4.6467	8.2383	11.5983	21.4033	22.3017	17.0133	23.8350	32.4200	34.1917
				Value	3.6878	5.4475	2.5802	3.8655	6.4557	5.7372	4.5845	14.2135	18.3802	19.0750
B167	N.Y. Community Bncp.	US	7	Price				4.6767	8.3833	9.8050	8.4850	11.7700	17.6167	21.6700
				Value				2.2812	2.2745	2.1782	2.0772	6.5482	14.8338	17.5199
B168	Ocwen Fin'l Corp	US	5	Price						9.9800	6.0533	6.7200	8.1333	2.8333
				Value						7.4806	5.6282	9.7312	8.1973	6.1555
B169	Bank One Corp	US	10	Price	28.6767	21.9333	30.6850	39.9433	48.9600	53.3767	31.4183	37.7517	38.5867	37.4950
				Value	17.2425	22.5908	10.7192	14.9886	13.1926	13.4535	12.7602	28.5792	41.7677	42.2360
B170	Pnc Financial Svcs	US	10	Price	29.1483	21.9000	29.9800	38.1483	54.4917	52.2933	44.2300	72.6033	58.0400	42.8867
				Value	21.1142	26.9969	10.1608	14.7526	14.9677	15.7048	16.7883	36.4248	37.4013	44.7268
B171	Regions Financial	US	10	Price	15.9283	15.7767	21.3283	26.0733	41.2417	39.6067	24.0850	28.0100	30.0433	33.7067
				Value	12.1739	15.9012	9.7098	12.1757	13.2010	12.3344	12.6762	22.9848	29.6963	30.5264
B172	Synovus Financial	US	10	Price	5.4700	5.4617	8.3883	14.0817	21.3817	23.4383	19.1483	26.5117	25.3933	19.7900
				Value	2.7826	3.3159	2.6170	3.5032	3.3839	3.3942	3.6824	9.0454	12.8952	14.4011
B173	Sovereign Bancorp	US	10	Price	7.2650	5.1983	6.6967	9.1567	16.6750	13.4900	7.2833	8.1417	12.3117	14.1200
				Value	3.8716	5.4002	6.0721	6.4564	4.5170	6.9872	6.7669	13.0296	16.7678	19.5182
B174	Suntrust Banks, Inc.	US	10	Price	22.7067	24.4667	33.5917	49.5233	69.7517	75.4267	65.2183	62.2517	61.7050	57.7567
				Value	16.6350	21.2922	12.1885	17.2431	20.4817	19.1366	18.5251	47.1321	58.6063	51.6439
B175	Tcf Financial Corp	US	10	Price	7.8900	9.9267	15.8133	21.5850	32.7733	24.0617	23.8450	40.9900	47.7467	43.7667
				Value	6.1171	11.3344	4.0245	6.6179	10.4050	8.9842	9.0126	19.0913	23.9083	23.8202
B176	Unionbancal Corp	US	10	Price	8.3867	9.3817	18.1083	17.7317	33.1850	33.6100	37.4817	26.2183	37.6950	40.9167
				Value	10.2171	12.3105	9.8958	13.4930	14.2264	14.6876	14.5821	31.7966	40.3602	45.4139
B177	Union Planters Corp	US	10	Price	16.8450	14.1250	20.9583	26.2917	42.1183	30.4783	24.6783	24.4367	29.7567	28.5817
				Value	14.2798	14.8629	9.1558	11.5712	11.7627	11.1337	10.2206	22.4438	28.8951	26.4823
B178	U.S. Bancorp	US	10	Price	3.9417	4.1100	6.5650	10.3067	18.5983	27.8867	21.4817	23.2400	20.4133	21.7800
				Value	2.6018	3.4635	1.8760	2.8180	8.5726	2.7100	9.2337	18.5103	16.0802	16.6016

Code	Name	Ctry	# of Years		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
B179	Valley National Banc	US	10	Price	9.9933	12.3200	11.9500	13.0600	20.1933	18.4700	17.8400	22.1067	24.9867	25.5000
				Value	6.5463	7.0576	7.4658	8.4229	7.2131	7.4429	6.5865	10.3134	12.4077	12.2567
B180	Wachovia Corp.	US	10	Price	20.8833	21.1150	27.2600	37.9167	49.7733	61.9383	33.5133	30.5850	31.4850	37.1200
				Value	17.4126	22.6620	10.6533	15.6687	18.1658	15.6931	14.2361	3.9752	40.2838	42.2969
B181	Webster Fin'L Corp	US	10	Price	10.3833	9.6550	14.1667	18.4883	31.4783	27.4400	23.1517	28.6150	31.2183	35.2433
				Value	14.6308	16.2419	6.8054	9.6691	10.9399	10.8292	10.6214	29.4108	40.4104	40.4238
B182	Wells Fargo & Co.	US	10	Price	12.3100	11.6450	16.4167	22.3850	36.9383	38.1567	39.8883	51.8767	43.6350	47.1000
				Value	6.6781	9.6555	4.3511	6.4215	8.1370	9.8565	11.1759	25.6806	30.5023	32.9896
B183	Wilmington Trst	US	10	Price	12.9400	11.6067	15.5650	20.0900	30.6067	29.6933	24.5633	29.6683	31.3567	32.1100
				Value	7.0757	9.3406	5.5475	7.0344	7.8475	7.6794	7.0410	15.9482	20.0351	19.1459
B184	Skand. Enskilda Banken	SE	7	Price				8.7800	11.3000	9.5117	9.9983	11.7600	9.1117	8.7733
				Value				3.5205	1.8550	4.6317	1.8120	6.2035	13.0318	17.9491
B185	Foereningsspar(Swedbank)	SE	5	Price						17.2600	14.9067	15.9533	12.1900	12.0667
				Value						7.0392	2.8444	7.2394	11.3144	12.4800
B186	Northwest Banc.Pa	US	6	Price		4.7567	7.2650	5.6211	11.1333	20.5783	17.3750	13.3250	15.0050	18.9883
				Value		8.2519	3.6526	6.1173	7.2166	7.7477	8.7200	11.4612	16.5810	14.6043
B187	Dime Cmty.Bksh.	US	5	Price						12.7100	10.0283	7.6717	13.0817	23.7783
				Value						7.9539	5.2193	12.2183	26.8836	13.4268
B188	Coml.Federal	US	10	Price				6.0583	7.3650	16.3333	9.4417	7.7150	10.1133	14.4450
				Value				2.2404	3.4528	4.9544	3.8327	7.3182	9.3665	8.4080
B189	Ang.Ir.Bk.	IR	10	Price	12.5967	10.9917	11.6750	12.4850	17.0500	16.6983	18.0650	15.2367	20.3983	22.2800
				Value	8.4321	10.8170	6.1305	8.6714	9.9935	9.2003	9.4145	15.5435	21.6121	20.1768
B190	Wash.Fed.Com.	US	9	Price	0.8300	0.8800	0.8967	1.0500	1.4217	2.4417	2.4933	2.0133	3.4483	6.1000
				Value	0.3400	1.0961	0.6285	0.7518	0.3600	0.8897	1.5630	1.6889	3.4716	5.6740
B191	Anchor Banc.Wisconsin	US	8	Price	0.7242	2.0133	2.4317	2.3056	5.0350	9.5483	10.4733	5.9883	9.2617	9.8150
				Value	0.6357	2.6995	1.8537	2.4190	1.4715	2.6287	4.0154	3.4204	6.9068	9.6619
B192	Bank Of Ir	IR	10	Price				13.1522	17.9067	19.4483	20.0733	16.3300	14.6383	11.9783
				Value				14.6359	10.9713	15.2320	13.3320	13.1845	14.5302	17.1159
B193	Ikb Dt.Indstrbk.	DE	6	Price	10.3267	10.6700	13.1900	17.1217	23.6100	33.0233	23.6150	15.8883	22.6533	28.7883
				Value	10.2035	13.9295	6.7555	8.8393	9.2255	11.6071	12.2035	25.4103	30.3217	22.1013
B194	Pff Bancorp	US	5	Price						19.5333	17.2500	14.9067	23.7100	29.1717
				Value						13.8018	13.7986	23.2595	35.6448	27.7163

Appendix C – Test Results Conventional Banks

Estimation sample Price/Book value – not controlled for first-degree serial autocorrelation

Dependent Variable	P?
Method	GLS (Cross Section Weights)
Date and Time	11/08/04 20:42
Sample	1993 2002
Included observations	10
Number of cross-sections used	150
Total panel (unbalanced) observations	1300
Convergence achieved after	14 iterations
White Heteroskedasticity-Consistent Standard Errors & Covariance	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
B?	2.002231	0.026588	75.30547	0.0000
Fixed Effects				
_B092--C	-11.19682			
_B093--C	14.69803			
_B094--C	1.211714			
_B097--C	0.214756			
_B101--C	-2.032809			
_B103--C	-3.260568			
_B104--C	1.178126			
_B105--C	1.760510			
_B107--C	7.023572			
_B108--C	4.413910			
_B110--C	-18.03179			
_B113--C	-52.93938			
_B115--C	-4.304006			
_B117--C	-35.01854			
_B119--C	1.625544			
_B121--C	7.207216			
_B123--C	94.75522			
_B125--C	199.2972			
_B128--C	9.404283			
_B130--C	18.54241			
_B132--C	3.504093			
_B134--C	-3.941639			
_B136--C	-15.49206			
_B137--C	12.65612			
_B139--C	-7.959190			
_B141--C	11.32771			
_B142--C	7.462322			
_B144--C	0.129198			
_B146--C	1.031463			
_B148--C	3.865707			
_B150--C	-11.58039			
_B152--C	-8.800906			
_B154--C	7.604929			
_B156--C	6.058088			
_B158--C	-1.630976			
_B160--C	10.86068			
_B162--C	4.225283			
_B165--C	5.103488			
_B167--C	3.222856			
_B169--C	3.273224			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B171--C	-0.485266			
_B173--C	-2.944625			
_B175--C	8.086942			
_B177--C	-1.331256			
_B179--C	5.816826			
_B181--C	-8.567150			
_B183--C	8.168563			
_B185--C	4.019685			
_B186--C	-2.629516			
_B187--C	-4.618119			
_B190--C	0.217339			
_B192--C	-10.36287			
_B193--C	-7.611971			
_B001--C	0.166666			
_B003--C	1.736570			
_B007--C	-7.567083			
_B008--C	-14.24936			
_B010--C	-11.76231			
_B011--C	-0.856697			
_B013--C	2.036522			
_B015--C	-2.655049			
_B018--C	-22.83022			
_B020--C	-4.765239			
_B021--C	-5.555539			
_B022--C	-5.951967			
_B024--C	2.734161			
_B026--C	-4.070874			
_B027--C	-1.605471			
_B031--C	1.621986			
_B033--C	-0.456876			
_B036--C	-0.249301			
_B037--C	-20.85548			
_B039--C	18.62704			
_B041--C	-6.771778			
_B043--C	-2.064551			
_B044--C	-9.204178			
_B046--C	-0.164875			
_B049--C	-0.585661			
_B052--C	-8.325307			
_B053--C	-9.399293			
_B055--C	-3.644475			
_B058--C	-4.277388			
_B060--C	-4.863134			
_B062--C	-20.21502			
_B064--C	10.11331			
_B067--C	9.078035			
_B068--C	2.226572			
_B071--C	3.260974			
_B073--C	-9.514979			
_B074--C	2.396919			
_B076--C	-10.83919			
_B078--C	-4.030398			
_B080--C	-42.25212			
_B082--C	-6.069708			
_B084--C	8.393563			
_B086--C	-0.532981			
_B088--C	3.689628			
_B092--C	-11.19682			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B093--C	14.69803			
_B094--C	1.211714			
_B097--C	0.214756			
_B101--C	-2.032809			
_B103--C	-3.260568			
_B104--C	1.178126			
_B105--C	1.760510			
_B107--C	7.023572			
_B108--C	4.413910			
_B110--C	-18.03179			
_B113--C	-52.93938			
_B115--C	-4.304006			
_B117--C	-35.01854			
_B119--C	1.625544			
_B121--C	7.207216			
_B123--C	94.75522			
_B125--C	199.2972			
_B128--C	9.404283			
_B130--C	18.54241			
_B132--C	3.504093			
_B134--C	-3.941639			
_B136--C	-15.49206			
_B137--C	12.65612			
_B139--C	-7.959190			
_B141--C	11.32771			
_B142--C	7.462322			
_B144--C	0.129198			
_B146--C	1.031463			
_B148--C	3.865707			
_B150--C	-11.58039			
_B152--C	-8.800906			
_B154--C	7.604929			
_B156--C	6.058088			
_B158--C	-1.630976			
_B160--C	10.86068			
_B162--C	4.225283			
_B165--C	5.103488			
_B167--C	3.222856			
_B169--C	3.273224			
_B171--C	-0.485266			
_B173--C	-2.944625			
_B175--C	8.086942			
_B177--C	-1.331256			
_B179--C	5.816826			
_B181--C	-8.567150			
_B183--C	8.168563			
_B185--C	4.019685			
_B186--C	-2.629516			
_B187--C	-4.618119			
_B190--C	0.217339			
_B192--C	-10.36287			
_B193--C	-7.611971			

Weighted Statistics			
R-squared	0.770184	Mean dependent var	335.3473
Adjusted R-squared	0.740182	S.D. dependent var	177.3954
S.E. of regression	90.42264	Sum squared resid	9394515.
F-statistic	25.67101	Durbin-Watson stat	1.082714
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.810433	Mean dependent var	45.64102
Adjusted R-squared	0.785686	S.D. dependent var	195.3253
S.E. of regression	90.42406	Sum squared resid	9394810.
Durbin-Watson stat	0.993442		

Estimation sample Price/Book value – controlled for first-degree serial autocorrelation

Dependent Variable	P?
Method	GLS (Cross Section Weights)
Date and Time	11/08/04 20:55
Sample	1993 2002
Included observations	10
Number of cross-sections used	150
Total panel (unbalanced) observations	1150
Convergence achieved after	30 iterations
White Heteroskedasticity-Consistent Standard Errors & Covariance	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
B?	0.868421	0.012980	66.90527	0.0000
AR(1)	0.653440	0.017110	38.19024	0.0000
Fixed Effects				
_B092--C	28.65205			
_B093--C	10.37003			
_B094--C	12.26521			
_B097--C	2.089759			
_B101--C	7.704882			
_B103--C	8.393712			
_B104--C	3.541805			
_B105--C	5.498871			
_B107--C	6.989141			
_B108--C	11.84666			
_B110--C	1.270917			
_B113--C	-20.53797			
_B115--C	1.121368			
_B117--C	-9.662409			
_B119--C	9.481185			
_B121--C	9.672281			
_B123--C	218.5322			
_B125--C	897.2027			
_B128--C	32.36525			
_B130--C	85.75134			
_B132--C	8.923241			
_B134--C	34.27771			
_B136--C	4.874102			
_B137--C	25.70607			
_B139--C	11.14664			
_B141--C	28.17438			
_B142--C	22.49990			
_B144--C	14.55470			
_B146--C	15.56617			
_B148--C	24.46594			
_B150--C	13.31509			
_B152--C	8.684825			
_B154--C	23.23685			
_B156--C	19.57932			
_B158--C	20.04906			
_B160--C	24.76894			
_B162--C	38.72851			
_B165--C	14.09785			
_B167--C	12.55016			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B169--C	24.03704			
_B171--C	18.52511			
_B173--C	4.641115			
_B175--C	26.91948			
_B177--C	16.88306			
_B179--C	16.05863			
_B181--C	14.34217			
_B183--C	21.11676			
_B185--C	6.320405			
_B186--C	8.798033			
_B187--C	9.355836			
_B190--C	2.257970			
_B192--C	4.858133			
_B193--C	11.24185			

Weighted Statistics			
R-squared	0.916349	Mean dependent var	417.8995
Adjusted R-squared	0.903692	S.D. dependent var	274.1158
S.E. of regression	85.06787	Sum squared resid	7222069.
F-statistic	72.40037	Durbin-Watson stat	1.931517
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	0.851831	Mean dependent var	48.63549
Adjusted R-squared	0.829413	S.D. dependent var	205.9651
S.E. of regression	85.06815	Sum squared resid	7222117.
Durbin-Watson stat	1.553058		

Estimation sample Price/Residual Income – not controlled for first-degree serial autocorrelation

Dependent Variable	P?
Method	GLS (Cross Section Weights)
Date and Time	02/09/04 21:26
Sample	1993 2002
Included observations	10
Number of cross-sections used	194
Total panel (unbalanced) observations	1680
Convergence achieved after	11 iterations
White Heteroskedasticity-Consistent Standard Errors & Covariance	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
V?	0.452255	0.006161	73.40085	0.0000
Fixed Effects				
_B001--C	20.25404			
_B003--C	18.71865			
_B007--C	13.27703			
_B008--C	6.803755			
_B010--C	10.77627			
_B011--C	20.15482			
_B013--C	12.43118			
_B015--C	11.65104			
_B018--C	9.664971			
_B020--C	15.62164			
_B021--C	7.731371			
_B022--C	9.645890			
_B024--C	14.64776			
_B026--C	9.914475			
_B027--C	7.682902			
_B031--C	13.09237			
_B033--C	7.119805			
_B036--C	8.977806			
_B037--C	9.011723			
_B039--C	29.32525			
_B041--C	10.65515			
_B043--C	12.04925			
_B044--C	6.851858			
_B046--C	5.683917			
_B049--C	7.461810			
_B052--C	4.794184			
_B053--C	5.758161			
_B055--C	12.00497			
_B058--C	11.72926			
_B060--C	11.43619			
_B062--C	21.43892			
_B064--C	21.54728			
_B067--C	29.28557			
_B068--C	9.437746			
_B071--C	26.32187			
_B073--C	7.270812			
_B074--C	14.46980			
_B076--C	16.17478			
_B078--C	9.068442			
_B080--C	25.71018			
_B082--C	25.17028			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B084--C	22.87457			
_B086--C	11.00243			
_B088--C	5.833989			
_B092--C	23.84335			
_B093--C	14.69153			
_B094--C	11.58837			
_B097--C	1.758655			
_B101--C	13.36905			
_B103--C	11.71049			
_B104--C	2.722959			
_B105--C	8.405040			
_B107--C	8.713366			
_B108--C	15.13632			
_B110--C	13.32446			
_B113--C	5.480833			
_B115--C	3.084221			
_B117--C	4.529613			
_B119--C	8.611506			
_B121--C	9.065620			
_B123--C	195.2567			
_B125--C	925.6252			
_B128--C	32.26645			
_B130--C	91.39428			
_B132--C	6.618237			
_B134--C	33.40655			
_B136--C	12.40536			
_B137--C	22.06720			
_B139--C	13.25791			
_B141--C	22.15687			
_B142--C	16.02281			
_B144--C	12.80312			
_B146--C	14.84283			
_B148--C	21.14359			
_B150--C	16.07102			
_B152--C	9.900922			
_B154--C	19.23911			
_B156--C	17.36667			
_B158--C	21.20234			
_B160--C	21.39346			
_B162--C	9.982613			
_B165--C	12.16994			
_B167--C	8.689755			
_B169--C	27.04474			
_B171--C	19.82926			
_B173--C	5.991258			
_B175--C	21.26283			
_B177--C	18.55438			
_B179--C	13.76559			
_B181--C	14.39194			
_B183--C	18.99465			
_B185--C	10.77431			
_B186--C	8.433205			
_B187--C	7.511204			
_B190--C	1.412927			
_B192--C	10.37002			
_B193--C	13.07783			

Weighted Statistics			
R-squared	0.716979	Mean dependent var	294.1136
Adjusted R-squared	0.680006	S.D. dependent var	161.0473
S.E. of regression	91.10129	Sum squared resid	12324677
F-statistic	19.39159	Durbin-Watson stat	0.960672
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	0.752559	Mean dependent var	39.84290
Adjusted R-squared	0.720233	S.D. dependent var	172.2377
S.E. of regression	91.10167	Sum squared resid	12324779
Durbin-Watson stat	1.027285		

Estimation sample Price/Residual Income – controlled for first-degree serial autocorrelation

Dependent Variable	P?
Method	GLS (Cross Section Weights)
Date and Time	02/09/04 21:24
Sample	1993 2002
Included observations	10
Number of cross-sections used	194
Total panel (unbalanced) observations	1486
Convergence achieved after	19 iterations
White Heteroskedasticity-Consistent Standard Errors & Covariance	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
V?	0.028653	0.008946	3.202869	0.0014
AR(1)	0.722623	0.015454	46.76072	0.0000
Fixed Effects				
_B001--C	39.88215			
_B003--C	31.99363			
_B007--C	24.10826			
_B008--C	24.71869			
_B010--C	27.27710			
_B011--C	36.54324			
_B013--C	23.53615			
_B015--C	23.53485			
_B018--C	23.63905			
_B020--C	20.69217			
_B021--C	16.07986			
_B022--C	18.40782			
_B024--C	24.18054			
_B026--C	21.66185			
_B027--C	16.20784			
_B031--C	20.50942			
_B033--C	15.61152			
_B036--C	19.17001			
_B037--C	32.69877			
_B039--C	44.62312			
_B041--C	22.18569			
_B043--C	22.47766			
_B044--C	0.980294			
_B046--C	10.30677			
_B049--C	14.19357			
_B052--C	12.68136			
_B053--C	7.900068			
_B055--C	20.54145			
_B058--C	19.52590			
_B060--C	20.19869			
_B062--C	38.98563			
_B064--C	37.44321			
_B067--C	48.90157			
_B068--C	13.56018			
_B071--C	41.64289			
_B073--C	5.678419			
_B074--C	14.65761			
_B076--C	20.88951			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B078--C	17.99662			
_B080--C	49.09087			
_B082--C	43.83552			
_B084--C	32.29434			
_B086--C	18.23416			
_B088--C	8.387508			
_B092--C	53.91505			
_B093--C	12.83346			
_B094--C	18.91491			
_B097--C	3.680559			
_B101--C	14.86212			
_B103--C	16.96224			
_B104--C	4.909384			
_B105--C	9.647950			
_B107--C	7.612791			
_B108--C	17.27529			
_B110--C	21.33395			
_B113--C	16.38299			
_B115--C	4.719976			
_B117--C	12.25951			
_B119--C	14.51432			
_B121--C	11.35958			
_B123--C	298.6629			
_B125--C	1493.999			
_B128--C	45.96303			
_B130--C	139.3910			
_B132--C	12.62455			
_B134--C	62.81437			
_B136--C	23.45388			
_B137--C	33.78510			
_B139--C	25.46689			
_B141--C	42.44859			
_B142--C	32.91540			
_B144--C	25.40471			
_B146--C	26.33983			
_B148--C	40.82040			
_B150--C	34.24556			
_B152--C	22.82374			
_B154--C	34.02106			
_B156--C	28.48854			
_B158--C	36.36651			
_B160--C	32.49776			
_B162--C	63.72150			
_B165--C	21.85827			
_B167--C	19.92682			
_B169--C	39.50194			
_B171--C	33.36163			
_B173--C	11.92366			
_B175--C	38.81033			
_B177--C	29.65454			
_B179--C	22.68102			
_B181--C	30.80782			
_B183--C	30.16057			
_B185--C	10.05250			
_B186--C	17.96399			
_B187--C	20.33285			
_B190--C	3.734886			
_B192--C	12.89237			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
B193–C	25.74935			

Weighted Statistics			
R-squared	0.804236	Mean dependent var	349.1171
Adjusted R-squared	0.774644	S.D. dependent var	165.0124
S.E. of regression	78.33416	Sum squared resid	7915751.
F-statistic	27.17729	Durbin-Watson stat	1.950801
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	0.838433	Mean dependent var	42.37138
Adjusted R-squared	0.814010	S.D. dependent var	181.6380
S.E. of regression	78.33416	Sum squared resid	7915751.
Durbin-Watson stat	1.753200		

Complete sample Price/BV – controlled for first-degree serial autocorrelation

Dependent Variable	P?
Method	GLS (Cross Section Weights)
Date and Time	11/08/04 19:06
Sample	1993 2002
Included observations	10
Number of cross-sections used	388
Total panel (unbalanced) observations	2970
Convergence achieved after	19 iterations
White Heteroskedasticity-Consistent Standard Errors & Covariance	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
B?	0.867273	0.014565	59.54552	0.0000
AR(1)	0.630451	0.010356	60.88028	0.0000
Fixed Effects				
_B001--C	22.10324			
_B002--C	11.16547			
_B003--C	18.61171			
_B004--C	1.002237			
_B005--C	5.965764			
_B006--C	13.18638			
_B007--C	10.34591			
_B008--C	4.079348			
_B009--C	14.36792			
_B010--C	10.61962			
_B011--C	19.82540			
_B012--C	15.50762			
_B013--C	14.46645			
_B014--C	1.583876			
_B015--C	12.23396			
_B016--C	6.173868			
_B017--C	15.54854			
_B018--C	0.946202			
_B019--C	5.492931			
_B020--C	10.14609			
_B021--C	6.984122			
_B022--C	7.237808			
_B023--C	38.83446			
_B024--C	15.25884			
_B025--C	14.58902			
_B026--C	9.220491			
_B027--C	8.135872			
_B028--C	9.043498			
_B029--C	10.90737			
_B030--C	0.727998			
_B031--C	12.25452			
_B032--C	15.72954			
_B033--C	7.985404			
_B034--C	8.768624			
_B035--C	6.829632			
_B036--C	10.46185			
_B037--C	6.008220			
_B038--C	22.30500			
_B039--C	33.99024			
_B040--C	12.45517			
_B041--C	8.180835			
_B042--C	13.76999			
_B043--C	12.11020			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B044--C	-5.622109			
_B045--C	18.51960			
_B046--C	5.736391			
_B047--C	3.340415			
_B048--C	6.773882			
_B049--C	8.057878			
_B050--C	7.425276			
_B051--C	10.66338			
_B052--C	2.412638			
_B053--C	-1.667591			
_B054--C	12.23916			
_B055--C	9.045297			
_B056--C	16.09661			
_B057--C	14.30527			
_B058--C	8.843925			
_B059--C	13.04437			
_B060--C	8.539996			
_B061--C	15.46572			
_B062--C	11.82150			
_B063--C	11.54287			
_B064--C	26.84054			
_B065--C	13.88636			
_B066--C	0.230720			
_B067--C	30.10193			
_B068--C	8.566370			
_B069--C	10.30704			
_B070--C	17.63104			
_B071--C	24.58024			
_B072--C	4.277056			
_B073--C	-1.307071			
_B074--C	10.88800			
_B075--C	19.67231			
_B076--C	7.343210			
_B077--C	31.42462			
_B078--C	8.627770			
_B079--C	6.305409			
_B080--C	12.92854			
_B081--C	9.943166			
_B082--C	21.24800			
_B083--C	9.009423			
_B084--C	22.53620			
_B085--C	7.167175			
_B086--C	11.09463			
_B087--C	26.39695			
_B088--C	6.703206			
_B089--C	4.191112			
_B090--C	19.94105			
_B091--C	44.44711			
_B092--C	28.02515			
_B093--C	11.44757			
_B094--C	12.12264			
_B095--C	13.52567			
_B096--C	8.616333			
_B097--C	2.090409			
_B098--C	5.505923			
_B099--C	0.490775			
_B100--C	0.448785			
_B101--C	7.939913			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B102--C	-0.364741			
_B103--C	8.399777			
_B104--C	3.480924			
_B105--C	5.633371			
_B106--C	7.613681			
_B107--C	7.179371			
_B108--C	11.90629			
_B109--C	3.998614			
_B110--C	1.627654			
_B111--C	1.766591			
_B112--C	5.073388			
_B113--C	-19.59790			
_B114--C	-11.23199			
_B115--C	1.153168			
_B116--C	-21.22041			
_B117--C	-9.313326			
_B118--C	-86.46912			
_B119--C	9.345533			
_B120--C	2.171257			
_B121--C	9.660467			
_B122--C	14.43693			
_B123--C	216.5003			
_B124--C	27.21192			
_B125--C	897.2511			
_B126--C	22.85657			
_B127--C	251.9606			
_B128--C	32.05846			
_B129--C	18.46640			
_B130--C	85.39402			
_B131--C	682.7927			
_B132--C	8.833492			
_B133--C	12.62918			
_B134--C	33.67150			
_B135--C	22.75992			
_B136--C	4.871972			
_B137--C	25.42227			
_B138--C	10.77512			
_B139--C	10.92049			
_B140--C	9.674443			
_B141--C	27.81371			
_B142--C	21.89946			
_B143--C	10.61367			
_B144--C	14.25752			
_B145--C	19.34290			
_B146--C	15.32747			
_B147--C	30.52213			
_B148--C	24.02800			
_B149--C	10.77150			
_B150--C	13.06849			
_B151--C	19.24398			
_B152--C	8.474462			
_B153--C	5.327853			
_B154--C	22.83912			
_B155--C	8.854459			
_B156--C	19.26638			
_B157--C	10.63259			
_B158--C	19.96931			
_B159--C	14.07657			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B160--C	24.43445			
_B161--C	17.56123			
_B162--C	37.80012			
_B163--C	39.02654			
_B164--C	18.07539			
_B165--C	13.91064			
_B166--C	18.94091			
_B167--C	12.22193			
_B168--C	-1.620027			
_B169--C	23.96055			
_B170--C	30.93688			
_B171--C	18.33639			
_B172--C	16.54455			
_B173--C	4.631138			
_B174--C	38.95530			
_B175--C	26.31932			
_B176--C	16.46357			
_B177--C	16.71592			
_B178--C	14.06994			
_B179--C	15.79632			
_B180--C	22.80505			
_B181--C	14.00528			
_B182--C	28.72865			
_B183--C	20.83141			
_B184--C	6.566808			
_B185--C	6.604869			
_B186--C	8.611224			
_B187--C	8.983816			
_B188--C	8.140143			
_B189--C	7.614138			
_B190--C	2.180333			
_B191--C	5.369267			
_B192--C	4.921472			
_B193--C	11.01185			
_B194--C	6.875024			

Weighted Statistics			
R-squared	0.886857	Mean dependent var	260.7852
Adjusted R-squared	0.869798	S.D. dependent var	151.2239
S.E. of regression	54.56697	Sum squared resid	7682089.
F-statistic	51.98706	Durbin-Watson stat	1.972491
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	0.905000	Mean dependent var	43.14343
Adjusted R-squared	0.890677	S.D. dependent var	165.0346
S.E. of regression	54.56713	Sum squared resid	7682136
Durbin-Watson stat	1.557093		

Complete sample Price/RI – controlled for first-degree serial autocorrelation

Dependent Variable	P?
Method	GLS (Cross Section Weights)
Date and Time	02/08/04 14:29
Sample	1993 2002
Included observations	10
Number of cross-sections used	388
Total panel (unbalanced) observations	2970
Convergence achieved after	16 iterations
White Heteroskedasticity-Consistent Standard Errors & Covariance	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
V?	0.031004	0.006291	4.928299	0.0000
AR(1)	0.713731	0.010685	66.79745	0.0000
Fixed Effects				
_B001—C	39.34680			
_B002—C	22.01680			
_B003—C	31.71346			
_B004—C	5.242977			
_B005—C	22.43990			
_B006—C	19.95024			
_B007—C	23.93043			
_B008—C	24.28340			
_B009—C	27.50120			
_B010—C	26.91742			
_B011—C	36.15581			
_B012—C	27.44091			
_B013—C	23.25868			
_B014—C	21.71393			
_B015—C	23.22208			
_B016—C	14.28089			
_B017—C	39.78694			
_B018—C	23.39007			
_B019—C	25.65796			
_B020—C	20.65362			
_B021—C	15.90263			
_B022—C	18.23628			
_B023—C	51.71860			
_B024—C	23.95738			
_B025—C	23.65830			
_B026—C	21.35331			
_B027—C	16.00449			
_B028—C	15.58124			
_B029—C	20.23261			
_B030—C	3.961005			
_B031—C	20.38093			
_B032—C	35.31904			
_B033—C	15.38292			
_B034—C	29.63274			
_B035—C	13.36371			
_B036—C	18.90595			
_B037—C	32.08657			
_B038—C	37.71117			
_B039—C	44.26281			
_B040—C	22.71068			
_B041—C	21.91422			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B042—C	26.69807			
_B043—C	22.24296			
_B044—C	1.311939			
_B045—C	33.49453			
_B046—C	10.20849			
_B047—C	17.56886			
_B048—C	17.21537			
_B049—C	14.01754			
_B050—C	11.98206			
_B051—C	19.84948			
_B052—C	12.51852			
_B053—C	7.921724			
_B054—C	21.65157			
_B055—C	20.40457			
_B056—C	26.22564			
_B057—C	22.67664			
_B058—C	19.38711			
_B059—C	22.50733			
_B060—C	20.02745			
_B061—C	25.79248			
_B062—C	38.72475			
_B063—C	21.68157			
_B064—C	37.02150			
_B065—C	30.27033			
_B066—C	12.25914			
_B067—C	48.45444			
_B068—C	13.52908			
_B069—C	11.55251			
_B070—C	25.04238			
_B071—C	41.44120			
_B072—C	6.424339			
_B073—C	5.917059			
_B074—C	14.83079			
_B075—C	40.08430			
_B076—C	21.00127			
_B077—C	58.45629			
_B078—C	17.79286			
_B079—C	25.71905			
_B080—C	48.73112			
_B081—C	60.72240			
_B082—C	43.43504			
_B083—C	11.87295			
_B084—C	32.11614			
_B085—C	11.16635			
_B086—C	18.08026			
_B087—C	37.47663			
_B088—C	8.333614			
_B089—C	7.490108			
_B090—C	39.07758			
_B091—C	87.58846			
_B092—C	53.35137			
_B093—C	13.30551			
_B094—C	18.79428			
_B095—C	23.86145			
_B096—C	12.11853			
_B097—C	3.655478			
_B098—C	11.80725			
_B099—C	2.810647			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B100—C	1.232778			
_B101—C	14.98282			
_B102—C	1.712091			
_B103—C	16.91016			
_B104—C	4.859331			
_B105—C	9.673840			
_B106—C	11.50705			
_B107—C	7.721509			
_B108—C	17.29584			
_B109—C	14.42324			
_B110—C	21.30531			
_B111—C	5.261837			
_B112—C	28.33761			
_B113—C	16.50124			
_B114—C	20.84544			
_B115—C	4.746739			
_B116—C	14.88974			
_B117—C	12.30296			
_B118—C	5.860857			
_B119—C	14.39404			
_B120—C	3.169289			
_B121—C	11.33102			
_B122—C	19.58415			
_B123—C	296.6550			
_B124—C	187.9399			
_B125—C	1485.542			
_B126—C	31.47517			
_B127—C	485.7550			
_B128—C	45.73931			
_B129—C	25.86703			
_B130—C	138.5552			
_B131—C	1428.176			
_B132—C	12.51266			
_B133—C	20.19931			
_B134—C	62.15174			
_B135—C	34.71665			
_B136—C	23.26127			
_B137—C	33.52671			
_B138—C	20.86179			
_B139—C	25.21647			
_B140—C	18.35997			
_B141—C	41.94860			
_B142—C	32.39373			
_B143—C	28.30565			
_B144—C	25.09101			
_B145—C	30.58640			
_B146—C	26.07838			
_B147—C	51.39096			
_B148—C	40.30955			
_B149—C	18.32356			
_B150—C	33.83838			
_B151—C	32.45349			
_B152—C	22.52759			
_B153—C	18.82334			
_B154—C	33.64741			
_B155—C	16.88581			
_B156—C	28.22299			
_B157—C	19.01010			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_B158—C	36.15010			
_B159—C	26.91469			
_B160—C	32.24880			
_B161—C	27.40146			
_B162—C	62.71779			
_B163—C	55.83922			
_B164—C	28.89340			
_B165—C	21.60724			
_B166—C	27.36190			
_B167—C	19.58521			
_B168—C	1.275760			
_B169—C	39.33263			
_B170—C	48.91595			
_B171—C	33.09352			
_B172—C	21.85065			
_B173—C	11.81147			
_B174—C	64.01299			
_B175—C	38.32822			
_B176—C	36.29007			
_B177—C	29.46671			
_B178—C	21.69975			
_B179—C	22.46577			
_B180—C	40.39673			
_B181—C	30.44522			
_B182—C	43.16041			
_B183—C	29.89255			
_B184—C	9.652121			
_B185—C	10.17439			
_B186—C	17.74037			
_B187—C	19.98551			
_B188—C	14.11479			
_B189—C	18.29507			
_B190—C	3.663549			
_B191—C	8.639133			
_B192—C	15.77344			
_B193—C	25.47955			
_B194—C	26.21986			

Weighted Statistics			
R-squared	0.805717	Mean dependent var	256.6945
Adjusted R-squared	0.776424	S.D. dependent var	121.4960
S.E. of regression	57.44790	Sum squared resid	8514674.
F-statistic	27.50544	Durbin-Watson stat	2.005689
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	0.894705	Mean dependent var	43.14343
Adjusted R-squared	0.878829	S.D. dependent var	165.0346
S.E. of regression	57.44790	Sum squared resid	8514674.
Durbin-Watson stat	1.779239		

Cross Sections

1993

Dependent Variable	NUM199301
Method	Least Squares
Date and Time	02/08/04 19:15
Sample (adjusted)	2 193
Included observations	118
Excluded Observations	74 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.498260	1.149385	-2.173564	0.0318
NUM199302	1.690899	0.200468	8.434762	0.0000

R-squared	0.907382	Mean dependent var	26.41804
Adjusted R-squared	0.906583	S.D. dependent var	100.9853
S.E. of regression	30.86530	Akaike info criterion	9.713946
Sum squared resid	110509.3	Schwarz criterion	9.760907
Log likelihood	-571.1228	F-statistic	1136.452
Durbin-Watson stat	3.091969	Prob(F-statistic)	0.000000

1994

Dependent Variable	NUM199401
Method	Least Squares
Date and Time	02/08/04 19:16
Sample (adjusted)	2 193
Included observations	125
Excluded Observations	67 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.233972	0.725779	-0.322374	0.7477
NUM199402	0.891514	0.042327	21.06239	0.0000

R-squared	0.983436	Mean dependent var	25.60013
Adjusted R-squared	0.983302	S.D. dependent var	98.95246
S.E. of regression	12.78688	Akaike info criterion	7.950588
Sum squared resid	20111.04	Schwarz criterion	7.995841
Log likelihood	-494.9117	F-statistic	7302.836
Durbin-Watson stat	2.279361	Prob(F-statistic)	0.000000

1995

Dependent Variable	NUM199501
Method	Least Squares
Date and Time	02/08/04 19:18
Sample (adjusted)	2 193
Included observations	140
Excluded Observations	52 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.890422	1.187130	0.750063	0.4545
NUM199502	1.514874	0.092581	16.36264	0.0000

R-squared	0.978510	Mean dependent var	31.10470
Adjusted R-squared	0.978355	S.D. dependent var	113.9089
S.E. of regression	16.75870	Akaike info criterion	8.489894
Sum squared resid	38757.84	Schwarz criterion	8.531918
Log likelihood	-592.2926	F-statistic	6283.698
Durbin-Watson stat	1.960367	Prob(F-statistic)	0.000000

1996

Dependent Variable	NUM199601
Method	Least Squares
Date and Time	02/08/04 19:18
Sample (adjusted)	2 193
Included observations	155
Excluded Observations	38 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.399273	1.072257	3.170203	0.0018
NUM199602	1.443668	0.079197	18.22886	0.0000

R-squared	0.978361	Mean dependent var	31.65963
Adjusted R-squared	0.978220	S.D. dependent var	103.2187
S.E. of regression	15.23323	Akaike info criterion	8.297654
Sum squared resid	35503.84	Schwarz criterion	8.336924
Log likelihood	-641.0682	F-statistic	6917.554
Durbin-Watson stat	1.939250	Prob(F-statistic)	0.000000

1997

Dependent Variable			NUM199701	
Method			Least Squares	
Date and Time			02/08/04 19:19	
Sample (adjusted)			1 193	
Included observations			171	
Excluded Observations			22 after adjusting endpoints	
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.094360	1.784339	2.855041	0.0048
NUM199702	2.069627	0.127264	16.26244	0.0000
R-squared	0.953490	Mean dependent var		41.58698
Adjusted R-squared	0.953215	S.D. dependent var		114.3810
S.E. of regression	24.74039	Akaike info criterion		9.266378
Sum squared resid	103442.6	Schwarz criterion		9.303123
Log likelihood	-790.2753	F-statistic		3464.657
Durbin-Watson stat	1.985865	Prob(F-statistic)		0.000000

1998

Dependent Variable			NUM199801	
Method			Least Squares	
Date and Time			02/08/04 19:19	
Sample (adjusted)			1 194	
Included observations			194	
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.278698	3.132943	0.727335	0.4679
NUM199802	1.947469	0.190062	10.24648	0.0000
R-squared	0.951083	Mean dependent var		47.68200
Adjusted R-squared	0.950829	S.D. dependent var		168.4320
S.E. of regression	37.34919	Akaike info criterion		10.08876
Sum squared resid	267832.8	Schwarz criterion		10.12244
Log likelihood	-976.6093	F-statistic		3733.041
Durbin-Watson stat	2.028811	Prob(F-statistic)		0.000000

1999

Dependent Variable	NUM199901
Method	Least Squares
Date and Time	02/08/04 19:20
Sample (adjusted)	2 193
Included observations	1 194
White Heteroskedasticity-Consistent Standard Errors & Covariance	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.265019	5.512542	-0.229480	0.8187
NUM199902	2.142949	0.409432	5.233957	0.0000

R-squared	0.899158	Mean dependent var	45.57110
Adjusted R-squared	0.898632	S.D. dependent var	179.2547
S.E. of regression	57.07161	Akaike info criterion	10.93675
Sum squared resid	625376.5	Schwarz criterion	10.97044
Log likelihood	-1058.864	F-statistic	1711.960
Durbin-Watson stat	2.465162	Prob(F-statistic)	0.000000

2000

Dependent Variable	NUM200001
Method	Least Squares
Date and Time	02/08/04 19:22
Sample (adjusted)	1 194
Included observations	194
White Heteroskedasticity-Consistent Standard Errors & Covariance	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-19.73305	10.76206	-1.833575	0.0683
NUM200002	2.408570	0.514733	4.679263	0.0000

R-squared	0.887515	Mean dependent var	54.97638
Adjusted R-squared	0.886929	S.D. dependent var	249.9379
S.E. of regression	84.04415	Akaike info criterion	11.71082
Sum squared resid	1356177.	Schwarz criterion	11.74451
Log likelihood	-1133.949	F-statistic	1514.893
Durbin-Watson stat	2.378100	Prob(F-statistic)	0.000000

2001

Dependent Variable	NUM200101
Method	Least Squares
Date and Time	02/08/04 19:23
Sample (adjusted)	1 194
Included observations	194

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.572390	2.201606	1.168415	0.2441
NUM200102	0.931681	0.078676	11.84202	0.0000

R-squared	0.956277	Mean dependent var	46.92614
Adjusted R-squared	0.956050	S.D. dependent var	176.9175
S.E. of regression	37.08961	Akaike info criterion	10.07481
Sum squared resid	264122.8	Schwarz criterion	10.10850
Log likelihood	-975.2563	F-statistic	4199.313
Durbin-Watson stat	1.808252	Prob(F-statistic)	0.000000

2002

Dependent Variable	NUM200201
Method	Least Squares
Date and Time	02/08/04 19:24
Sample (adjusted)	1 194
Included observations	194

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.752381	5.915499	0.634330	0.5266
NUM200202	0.835679	0.206167	4.053401	0.0001

R-squared	0.844327	Mean dependent var	42.06452
Adjusted R-squared	0.843516	S.D. dependent var	140.3332
S.E. of regression	55.51308	Akaike info criterion	10.88137
Sum squared resid	591686.8	Schwarz criterion	10.91506
Log likelihood	-1053.493	F-statistic	1041.354
Durbin-Watson stat	1.785127	Prob(F-statistic)	0.000000

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